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FLORA OF PERU

BY

J. FRANCIS MACBRIDE

ASSOCIATE CURATOR OF THE HERBARIUM, DEPARTMENT OF BOTANY

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FLORA OF PERU

J. Francis Macbride

LEGUMINOSAE. Bean Family

The legumes, for amateur or for professional student marked most characteristically by the fruit being a pod (rarely drupe-like) in contrast to the somewhat similar roses with the fruit a drupe or achenes enclosed in a receptacle, are grouped into three merging subfamilies (as defined below). The pods sometimes separate into 1-seeded segments, sometimes are margined or winged and samaroid. Stipules usually present. Leaves rarely simple. Flowers papilionaceous or more or less regular, in the former case ordinarily hermaphrodite, in the latter polygamous. Petals and sepals (calyx sometimes cupulate or cyathiform) same number. Stamens various in number. Carpel solitary, 1-celled, the ovules generally more than 1 attached at interior angle.

Products of economic importance are many and varied: they range from beans to insect powder, from timbers extremely hard or soft to resins and oils, from fibers and forage crops to agents for tanning leather and other chemical or medicinal products. A number of these that are of exceptional value are Peruvian in origin or are produced in Peru (as indicated in the following text); for example, many timbers, the insecticide rotenone (*Derris*), the soil-builder *Crotalaria*, the tannin agent tara (*Caesalpinia*), to mention only a few.

Key to subfamilies

Flowers regular, small (sometimes showy, the stamens long); calyx valvate (imbricate in *Parkia*); stamens distinct or united; leaves bipinnate except *Inga*..... *Mimoseae.*

Flowers more or less irregular.

Calyx lobes free (in *Poeppigia* and *Dimorphandra* united, but flowers pea-like; in *Bauhinia, Swartzia, Lecointea* calyx in bud entire, later variously cleft or cupulate); stamens 4–10, sometimes more, often partly sterile or staminodia (p. 113). *Caesalpinieae.*

Calyx lobes or sepals connate, the tube usually campanulate or tubular, the receptacle usually very short or wanting, rarely slender and stalk-like; flowers usually papilionaceous (p. 228). *Papilionaceae.*

MIMOSEAE

Generic key to Peruvian species

Leaves simply pinnate; spines none; pods if dehiscent tardily, the seeds often in a pulp.....1. *Inga.*

Leaves bipinnate (sometimes in *Mimosa* pseudodigitate or leaflets rarely none, sometimes, as in *Pithecolobium,* 1 pair pinnae of 2–3 leaflets).

Flowers borne in heads or umbellately capitate.

Stamens as many or twice as many as the corolla lobes, usually 5 or 10, or sometimes also with, or replaced in part by, staminodes.

Trees or shrubs, unarmed except sometimes *Mimosa, Piptadenia.*

Flowers very small in tight globose or clavate heads, partly or all bisexual and with staminodes; calyx lobes short, broad, imbricate.....18. *Parkia.*

Flowers small but not as above; calyx if developed, valvate.

Calyx minute or obsolete; pods breaking into joints. 9. *Mimosa.*

Calyx often well-developed, dentate; pods bivalved.

Anthers eglandular; leaflets about 1 cm. long or longer. 12. *Leucaena.*

Anthers glandular in bud; leaflets minute except 1 species.....13. *Piptadenia.*

Herbs or more or less woody undershrubs.

Anthers glandular; stamens usually 10, the lower flowers with staminodia; pods oblong; aquatic or low half shrub.....16. *Neptunia.*

Anthers eglandular.

Pods narrowly linear; lowest flowers male or provided with staminodia.

Unarmed plants; flowers greenish-white with 5 or 10 stamens.....11. *Desmanthus.*

Aculeate plants; flowers pink or lilac with usually 8–12 stamens.....10. *Schrankia.*

Pods oblong, sometimes narrowly oblong; most species without any staminodial flowers.....9. *Mimosa.*

Stamens indefinite, rarely 10 or fewer, often many, even 100.

Stamens more or less connate, often elongate and the flowers showy; spines usually lacking except *Pithecolobium dulce*.

Pod valves not separating from margins; stamens more or less connate, few to many.

Anthers glabrous; pods rather thick, rarely straight, the valves if dehiscing, not elastically, continuous or more or less (to completely) septate.

Inflorescence not nodulate.

Pods incurved reniform.....4. *Enterolobium*.

Pods various but not as above.

2. *Albizzia*, 3. *Pithecolobium*.

Inflorescence nodulate, i.e. peduncles borne from enlargements on rachis.....5. *Cedrelinga*.

Anthers usually glandular-hirsute; pods usually flat, narrow, straight or nearly, elastically dehiscing.

6. *Calliandra*.

Pod valves (in age) separating from the persisting margins (always?); stamens connate into a tube, in the Peruvian species about 50; leaflets minute with submarginal nerve.....7. *Lysiloma*.

Stamens free unless at base (cf. *Pithecolobium multiflorum*, *Calliandra*); flowers small; stipules usually spinescent.

8. *Acacia*.

Flowers borne in cylindrical spikes.

Stamens indefinite, few to many (rarely 10 in *Pithecolobium*).

Stamens more or less connate; shrubs or trees except *P. dulce* unarmed.....3. *Pithecolobium*.

Stamens free or nearly; plants often aculeate.....8. *Acacia*.

Stamens as many or twice as many as the corolla lobes.

Anthers eglandular; pods breaking into joints between the persisting margins.....9. *Mimosa*.

Anthers glandular (unless *Piptadenia*) at least before anthesis; pods, except in *Entada*, bivalved.

Smooth or finely aculeate lianas; spikes congested to form a broom-like inflorescence; pods flat, breaking into 1-seeded joints.....15. *Entada*.

Armed or smooth shrubs or trees; spikes not congested; pods bivalved.

Smooth or prickly, leaflets usually many.

Pods plane, continuous within; seeds without albumen. 13. *Piptadenia.*

Pods turgid, septate between the albuminous seeds. 14. *Stryphnodendron.*

Nodosely armed (usually), the pinnae and leaflets few; pods subcompressed or subcylindrical, often septate. 17. *Prosopis.*

1. INGA Willd.

Reference: Benth. Trans. Linn. Soc. 30: 600–632. 1875.

Unarmed trees or shrubs with simply pinnate leaves (the rachis often more or less margined), and globosely umbellate, spicate or racemose often showy flowers. Peduncles solitary or fascicled, axillary or panicled at the branchlet tips. Flowers 5 (6) -merous, mostly hermaphrodite, the tubular or campanulate calyx dentate or shortly lobed, the elongate corolla with valvate petals coalescent to the middle or higher. Stamens many, long-exserted. Ovary sessile, many-ovuled. Pods narrow, straight or somewhat incurved, rarely twisted, flat, 4-sided or subcylindric, the margins usually enlarged, coriaceous or subfleshy, tardily if at all dehiscing, the seeds sometimes surrounded with a pulp.—Cf. *Pithecolobium inundatum* and *P. Martinianum*, which might be sought in this group.

With *Erythrina*, *Inga* is one of the most important trees used for shade in plantations of coffee and cocoa; *Inga* is said to be preferable; cf. Pittier, Journ. Dept. Agric. Porto Rico 13, no. 4. 1929.

The genus was divided by Bentham into 5 sections, all of which now provisionally contain species which with our present knowledge are not definitely assignable, therefore here, for convenience (except for the section *Leptinga* including *Diadema*, marked by the flowers being borne on a globose or extremely short rather clavate receptacle, the inflorescences thus umbelliform) the key has been based on the presence or absence of a wing-margin to the leaf-rachis and on the size of the flowers; this probably results, at least in some instances, from specimens being maintained as species that may actually be merely at variance, that is, with or without the leaf-rachis winged. The size of the flowers is probably a better criterion but until fruits are more generally known no lineal key seems possible. *Inga* fruits are, in many species, flat; in fewer quadrate or cylindrical, but, unknown in most species, keys based on the character are useless. It seems futile to group the species into series. Ducke, Archiv.

Jard. Bot. Rio Jan. 4: 19–28. 1925, gave a key to the species of Pará, Pittier, Contr. U. S. Nat. Herb. 18: 173–223. 1916, a partial revision.

I. pisana G. Don, Gen. Syst. 2: 388. 1832, and *I. carnosa* G. Don, l.c. 391, based on Ruiz & Pavón material in herb. Lambert, were not identified by Bentham but the latter as labeled in herb. Pavón is, fide Bentham, 534, *Lysiloma tergemina* Benth. of Mexico and therefore probably a Mociño & Sessé specimen. *I. diadema* Mart., to which Bentham referred with doubt *Spruce 4565* in fruit from Tarapoto, is also omitted from the key; cf. note to *I. tarapotensis*. Kuntze, Rev. Gen. 1: 187. 1891, employed the name *Feuilleea* for many species (including *Calliandra* and *Pithecolobium*); the resulting combinations with Kuntze as author have not been cited.

Inflorescence globosely umbelliform; calyces, if sessile, glabrous or nearly (*I. vismiaefolia, I. chartacea*, etc. might be sought here). Section *Leptinga*, including *Diadema*.

Leaf-rachis wing-margined.

Stamen tube long-exserted; pedicels minutely villous; leaflets ample, the larger 2 dm. long..... *I. umbratica.*

Stamen tube included or (typically) shortly exserted; puberulence, if present, dense or appressed; leaflets rarely 12 cm. long.

Leaflets obtuse..... *I. Augusti.*

Leaflets acuminate.

Pedicels 8 mm. long or longer; calyces about 4 mm. long. *I. myriantha.*

Pedicels and calyces subequal, much shorter.. *I. lateriflora.*

Leaf-rachis little if at all margined (except *I. cecropietorum* under *I. Tessmannii*).

Flowers glabrous or essentially except *I. graciliflora* with abruptly expanded limb; peduncles simple, solitary in the axils or fascicled at the lower nodes.

Leaflets all small, even the larger well under 10 cm.

Leaflets long acuminate..... *I. heterophylla.*

Leaflets obtuse or if acuminate very shortly and obtusely.

Pedicels several mm. long..... *I. cynometrifolia.*

Pedicels 1 mm. long..... *I. tarapotensis.*

Leaflets medium, at least the larger usually longer than 10 cm.

Calyx about half as long as the corolla, glabrous or nearly, sessile or pedicellate.

Corolla 8–10, calyx 4–6 mm. long, sessile or pedicellate. *I. Tessmannii.*

Corolla 7 mm. long or a little longer than the sessile calyx. . . . . *I. cinnamomea.*

Calyx much less than one-half as long as the corolla, at least minutely pedicelled.

Pedicels less than 5 mm. long.

Flowers pedicellate; stamen tube more or less exserted. *I. lallensis.*

Flowers subsessile; stamen tube included. *I. tenuistipula.*

Pedicels 5 mm. long or longer.

Peduncles a cm. or so long. . . . . *I. graciliflora.*

Peduncles all or mostly much longer. . . . . *I. coriacea.*

Flowers puberulent, the corolla not abruptly expanded at limb; peduncles usually, at least the upper, more or less branched.

Corolla narrowly conical; leaflets not narrowed to base. *I. quaternata.*

Corolla with campanulate limb; leaflets little if at all narrowed to the acute tip, narrowed to base. . . . . *I. Pardoana.*

Inflorescence not clearly umbelliform, sometimes long-spicate, often ovoid-capitate, the rachis sometimes very short; calyx usually sessile (exceptions, *I. brachyrhachis, I. ingoides, I. laxiflora, I. nobilis, I. tarapotensis*) and pubescent (exceptions, *I. brachyrhachis, I. capitata*), always pubescent (unless *I. tarapotensis*), when the rachis is so short that the flowers are globosely congested, simulating the umbelliform group of species.

Flowers, excluding stamens, 10 mm. long or longer or, if shorter, plants glabrous (cf. *I. punctata*, var.).

Leaf-rachis definitely wing-margined, at least some leaves.

Calyx tomentulose to densely hirsute-villous (sometimes glabrate in *I. striata*, trichomes lax or weak, rarely lacking).

Flowers considerably to much shorter than 3 cm.

Calyx glabrate (glabrous) to loosely pilose, the narrow teeth acuminate, the tube striate. . . . . *I. striata.*

Calyx tomentulose or appressed strigillose, the broad teeth acute, the tube more or less obscurely striate.

Leaflets usually not densely pilose beneath, in any case conspicuously reticulate; flowers 12–20 mm. long.

Flowers sessile.

Peduncles solitary or geminate; bracts linear to narrowly lanceolate; leaflets firm, yellowish-green, reticulate, the nerve glandular or the bracts linear.

Leaflet midnerve eglandular; bracts linear; pod face open. . . . . *I. Feuillei.*

Leaflet midnerve often with 1–several glands; bracts lanceolate; pod face more or less closed by the multi-sulcate margins. *I. adenophylla.*

Peduncles often fascicled, often borne on a common axis; leaflets membranous-chartaceous, dark green, little reticulate, never glandular; bracts not linear.

Axis subterete; leaf not bristle-tipped. . *I. edulis.*

Axis acutely angled; leaf-rachis bristle-tipped. *I. conferta.*

Flowers pedicellate.

Racemes solitary. . . . . *I. laxiflora.*

Racemes fascicled. . . . . *I. ingoides.*

Leaflets densely soft-pilose beneath, obscurely reticulate.

Flowers 10–11 mm. long. . . . . *I. Endlicheri.*

Flowers about 18 mm. long. . . . . *I. aria.*

Flowers 3–5 cm. long.

Peduncles nearly lacking; flowers 4–5 cm. long. *I. plumifera.*

Peduncles more or less elongate; flowers 3–3.5 cm. long.

Bracts caducous; calyx 2 cm. long. . . . . *I. velutina.*

Bracts persisting; calyx 1 cm. long. . . . . *I. Donaeana.*

Calyx glabrous or setulose, the trichomes long or if minute, sparse.

Calyx glabrous, the pubescence of stems and leaves not conspicuously long.

Bracts persisting; peduncles short. . . . . *I. macrophylla.*

Bracts caducous; peduncles elongate. . . . . *I. longipes.*

Calyx usually more or less setulose, usually other parts as well, these conspicuously long-setose if calyx glabrous.

Flower-heads shortly peduncled or subsessile, the persisting ovate bracts 3–4 mm. long.

Corolla glabrous; leaflet midnerve eglandular. *I. Poeppigiana.*

Corolla pubescent; leaflet midnerve usually with 1–several glands on upper side. . . . . *I. pruriens.*

Flower-heads long-peduncled, the linear-lanceolate bracts often longer or inconspicuous and caducous.

Branchlets not long-setose nor leaflets long-pilose, 2–4 pairs.

Corolla 12–18 (23) mm. long.

Leaflets mostly 5 cm. wide or wider. . . *I. setifera.*

Leaflets mostly narrower than 2.5 cm.

Leaflets 3 pairs. . . . . *I. aliena.*

Leaflets 2 pairs. . . . . *I. stenoptera.*

Corolla about 3 cm. long. . . . . *I. Pavoniana.*

Branchlets long-setose; leaflets long-pilose both sides, 5–6 pairs.

Calyx 10 mm. long, the corolla tube included. *I. setosa.*

Calyx 6 mm. long, the corolla tube exserted. *I. hirsutissima.*

Leaf-rachis emarginate or essentially.

Calyx and corolla glabrous or more or less long-setulose, the trichomes scattered.

Petioles and branchlets glabrous. . . . . *I. capitata.*

Petioles and branchlets long-setose. . . . . *I. stipulacea.*

Calyx or at least the corolla densely or evenly pubescent or tomentulose-pubescent.

Calyx less than a third as long as the corolla. . *I. peltadenia.*

Calyx about half as long as the corolla (cf. exceptionally *I. nobilis*, *I. punctata*).

Flowers pedicellate.

Plants villous.

Calyx narrowly funnelform. . . . . *I. pulchriflora.*

Calyx obconic. . . . . *I. vismiaefolia.*

Plants glabrate. . . . . *I. loretana.*

Flowers sessile.

Leaflets rarely as few as 3 pairs.

Veins obscure above.....*I. Killipiana.*

Veins conspicuous both sides.....*I. Mathewsiana.*

Leaflets 2 pairs.....*I. maynensis.*

Flowers excluding stamens 3–8 (9) mm. long (cf. the completely glabrous *I. capitata* et rels.).

Spikes, at least mostly and typically, on axillary fascicled and long peduncles or these short and often arranged on a central axis; leaf-rachis emarginate or merely ridge-edged (cf. *I. densiflora*).

Veins of the lustrous rather coriaceous leaflets obscure above; flowers sessile.

Leaflets 2–4 pairs; stamen tube included or barely exserted.

Corolla tubular; midnerve of leaflets not densely strigose.

Leaflets 2 pairs (typically), usually punctate-scabrous-hispid both sides.....*I. punctata.*

Leaflets 3–4 pairs.

Leaflets glabrous, oblong-elliptic or oblong-lanceolate.....*I. Ruiziana, I. acreana.*

Leaflets hispidulous beneath, obovate....*I. obscura.*

Corolla rather obconic; leaflet midnerve densely strigose.

Spikes soon short-oblong; leaf pubescence between nerves sparse.....*I. lineata.*

Spikes ovoid; leaf pubescence soft.....*I. Endlicheri.*

Leaflets 4–6 pairs; stamineal tube often exserted.

Spikes ovoid.....*I. Ruiziana.*

Spikes elongate.....*I. lopadadenia.*

Veins of the subchartaceous leaflets reticulate both sides.

Peduncles long; stamen tube little if at all exserted.
I. nobilis.

Peduncles short; stamen tube long-exserted.....*I. alba.*

Spikes axillary or subaxillary but solitary or in any case crowded and shortly peduncled or subsessile in the axils or at defoliate nodes, the peduncles usually shorter than the spikes, always (except in *I. lopadadenia*) if the petiole is emarginate (cf. *I. alba*, marked by very long-exserted stamen tube).

Flowers minutely pedicellate, if in elongate racemes the leaflets 1 pair.

Rachis of leaves emarginate, the leaflets 2–3 pairs.

Inflorescence globose, the peduncles 12–25 mm.; corolla 5 mm. long; leaflets small.....*I. tarapotensis.*

Inflorescence oblong-ovoid, subsessile; corolla 7 mm. long; leaflets ample.....*I. brachyrhachis.*

Rachis of leaves margined and with 1 pair of leaflets. *I. cordatoalata.*

Flowers sessile or subsessile, the leaflets all or mostly 2–several pairs.

Bracts minute or not exceeding the calyx.

Rachis of leaves if winged only just below the medium-sized leaflets, their nervation not impressed above.

Leaf-rachis glands small or the leaflets mostly or all fewer than 4 pairs.

Corolla 3–4 (4.5) mm. long; leaflets 2 (–3) pairs; spikes elongate, mostly 7 cm. long or longer. *I. marginata.*

Corolla (4) 5–6 mm. long; spikes 5 cm. long or shorter (cf. also *I. alba*, flowers smaller).

Leaf-rachis emarginate or essentially; stamen tube finally long-exserted.

Leaflets 2–4 pairs.

Leaflets coriaceous, blunt; spikes sessile. *I. Klugii.*

Leaflets membranous, acuminate; spikes shortly peduncled.....*I. aggregata.*

Leaflets commonly 6 pairs.....*I. altissima.*

Leaf-rachis definitely winged; flowers 4 mm. long.

Leaf-rachis puberulent; leaflets 3 pairs. *I. yacoana.*

Leaf-rachis glabrous; leaflets 2 pairs....*I. apta.*

Leaf-rachis glands large, cuplike; leaflets 4 pairs. *I. lopadadenia.*

Rachis of leaves usually conspicuously winged, the leaflets ample, the venation often more or less impressed above.

Pubescence, at least on leaves, spreading, stiff.

Leaflet internodes 1–3 cm. long.....*I. densiflora.*

Leaflet internodes mostly much longer.
I. Bonplandiana, I. chartacea.
Pubescence tomentulose.....*I. tomentosa.*
Bracts (3) 4–6 mm. long, exceeding the calyx.
Flowers 7–8 mm. long.....*I. auristellae.*
Flowers 3–4 mm. long.....*I. microcoma.*

Inga acreana Harms, Notizbl. Bot. Gart. Berlin 6: 298. 1915. *I. myriocephala* Pittier, Contr. U. S. Nat. Herb. 18: 184. 1916.

Similar to *I. punctata* but the leaflets 3–4 pairs, oblong-lanceolate, glabrous; peduncles puberulent, 2–3 cm. long; calyx 3–4 mm. long, the corolla about 7 mm. long.—*Williams 2158* was referred by Harms to *I. stenoptera* Benth., 616, which at least as to type is very different; this collection seems to match *I. acreana* except that the leaf-rachis is somewhat more margined (in type obscurely). Ducke has suggested that Harms' species is perhaps a variety of *I. nobilis* but it seems probable that it is a form of *I. acrocephala* Steud. of Surinam and scarcely distinguishable unless by the slightly margined rachis, less heavy coriaceous leaflets. Pittier gives the average calyx length of his species as 5 mm., the corolla 9 mm. F.M. Neg. 1134.

Loreto: Caballo-Cocha, *Williams 2158.* Pumayacu, *Klug 3155* (det. Standl., *I. punctata*).—Río Acre: Seringal San Francisco, *Ule 9425*, type. Bolivia; Brazil.

Inga adenophylla Pittier, Contr. U. S. Nat. Herb. 18: 210. 1916.

Shortly rusty villous-tomentulose except the winged leaf-rachis and leaflets above, these sparsely pubescent; glands small, slightly raised and subcupulate not only between the 5–6 pairs of oblong-elliptic leaflets but ordinarily 1 to several, even as many as 6 scattered along the more densely pubescent midnerve of each leaflet; leaflets rounded at base, obtuse or acute and mucronulate, coriaceous, strongly nerved and reticulate beneath, the larger 8–11 cm. long, 3.5–5.5 cm. broad, mostly about 9 cm. long, 3.5 cm. broad; peduncles often geminate, 2–5 cm. long; bractlets linear-lanceolate to 7 mm. long, caducous by anthesis; flowers sessile, the calyx to 8.5 mm. long, with very short teeth or these to 3 mm. long; corolla silky-villous, somewhat dilated at apex, 15–17 mm. long, the lobes about 3 mm. long; stamen tube included or slightly exserted; pods funiculiform, 10–15 cm. long, about 8 mm. thick, rusty-tomentulose, the sulcate margins almost entirely covering the valves.—Nearly

I. affinis DC. to which it could be referred as a variety but the glands are more consistently and uniformly present on the upper surfaces of the leaflets. The species is probably *I. Feuillei* as to most of Weberbauer's citations.

Junín: Huacapistana, 1,800 meters, *Killip & Smith 24185; (Raimondi)*. Colonia Perené, 600 meters, *Killip & Smith 25127* (det. Harms, *I. affinis?*). La Merced, *Killip & Smith 23412; 24045*. Chanchamayo, *Isern 2438*.—Ayacucho: Aina, *Killip & Smith 22613; 23194* (the former in open woods, the latter cultivated, shaped like an apple tree).—Cuzco: Valle de San Miguel, 2,200 meters, *Herrera 1982*. Valle del Apurímac, 2,800 meters, *Herrera 1179*.—Puno: Near Sandía, *Weberbauer 1059* (det. Harms, *I. affinis*); (*Raimondi*). Bolivia. "Pasae," "paccai," "kkusillo-paccai," "pacay."

Inga aggregata G. Don, Gen. Syst. 2: 391. 1832; 609.

Glabrous except for the minutely puberulent subsessile ovoid spikes solitary or clustered in the defoliate axils of the slender branchlets; leaf-rachis obscurely or narrowly margined, the glands depressed; leaflets at least mostly 3–4 pairs, oblong-elliptic, somewhat oblique at base, rather obtusely acuminate, the larger 1.5 dm. long, nearly half as broad, membranous, or in age subcoriaceous, lustrous, finely reticulate-veined, especially beneath; calyx puberulent, about 1 mm. long; corolla 5–6 mm. long, glabrous, the stamen tube long-exserted; pods (fide Bentham) straight or arcuate, 12–14 mm. broad.—Cf. *I. tenuirama* Harms under *I. punctata*. F.M. Negs. 1071; 32062.

Huánuco: Pueblo Nuevo, *Ruiz & Pavón*.—Loreto: Yurimaguas, *Poeppig 2208* (det. Benth.). Yarina Cocha, Middle Ucayali, *Tessmann 3425* (det. Harms, *I. alba* affine). Bolivia.

Inga alba (Swartz) Willd. Sp. Pl. 4: 1013. 1806; 610. *Mimosa alba* Swartz, Fl. Ind. Occ. 2: 796. 1800.

Young branchlets densely white lenticellate and the peduncles and leaf-rachi (these emarginate or usually slightly margined between the upper pairs of leaflets, the glands depressed), puberulent or even tomentulose, the minute trichomes rusty; leaflets 3–4 (5) pairs, ovate, elliptic or oblong-obovate, more or less oblique at the shortly narrowed base, shortly and obtusely acuminate, mostly to about 10 cm. long, 4 cm. broad or on new shoots somewhat larger, on the flowering branchlets often a third smaller, membranous, glabrous, prominently reticulate-veined and lustrous both sides; peduncles

rarely 1 cm. long, fascicled in the axils or on short branchlets from the older wood below the leaves, the spikes scarcely 1 cm. long; calyx minutely puberulent, 1 mm. long or little longer, the glabrous corolla 3.5 to less than 4 mm. long, the slender stamen tube long-exserted; pods sessile, to 15 cm. long, 15–18 mm. broad, pulverulent or glabrous.—Tree sometimes 30 meters high, the flowers white. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 126*.

Peru (possibly). Brazil to the Guianas and Venezuela.

Inga aliena Macbr., spec. nov.

Frutex, 1.5 m. altus vel altior; ramulis subadpresse denseque hirsuto-pubescentibus; stipulis ovato-lanceolatis, setaceo-caudatis, striatis, 8 mm. longis, 2 mm. latis; foliolis 3-jugis petiolulatis (petiolo communi conspicue alato) anguste oblongo-ellipticis vel -lanceolatis, basi in petiolulum angustatis, apicem versus attenuatis et setaceo-mucronatis, ad 8 cm. longis, 2.5 cm. latis, coriaceis, utrinque sparse adpresseque hispidulis, nitidulis; pedunculis axillaribus circa 5 cm. longis; capitulis ovoideis; bracteis persistentibus lanceolatis; floribus sessilibus, corolla dense strigoso-setulosa calyce sparse setuloso 6 mm. longo duplo longiore.—Perhaps allied to *I. stenoptera* Benth. with 2 pairs of thinner leaflets, narrower winged petioles and less persistent bracts. A detached pod is closely veined transversely, sparsely hispidulous, 8 cm. long, 8 mm. wide.

Loreto: Pumayacu, near Balsapuerto, *Klug 3170*, type.

Inga altissima Ducke, Archiv. Inst. Biol. Veg. Rio Jan. 4: 4. 1938.

Affine *I. alba;* leaflets usually 6 pairs (4–6), oblong-lanceolate, the larger to 12 cm. long, 4 cm. broad, rather coriaceous, the narrow rachis not dilated, the elevated glands with narrowed, somewhat stipe-like bases; peduncles 12–20 mm. long, the spike short and dense, nearly all closely fascicled on branchlets below the leaves; flowers white, the calyx 1.5–2 mm. long, the corolla about 5 mm. long.—Remarkable for its height, about 40 meters, with stout cylindrical trunk, the related species rarely attaining 30 meters (Ducke). The type from Tabatinga in non-inundated woods across the Amazonian boundary with Peru.

Peru (undoubtedly). Brazil.

Inga apta Macbr., spec. nov.

Arbor ad 10 m. alta; ramulis subangulatis, glabris; foliolis 2-jugis, sessilibus (petiolo communi distincte alato) elliptico-oblongis ad

basin oblique attenuatis (basi ipse cordatulatis) apice breviter acutis vel obtuse acuminatis, majoribus 14 cm. longis, 6 cm. latis, coriaceis, nitidis, glabris ubique mediocriter reticulato-venosis; spicis subsessilibus 2–3 axillaribus 3.5 cm. longis; bracteis caducis glabris 1 cm. longis, 3 mm. latis; bracteolis minutis, ovatis, subpersistentibus; floribus sessilibus corolla minutissime parceque adpresse puberula 3.5 mm. longa calycem plus triplo excedente, staminum tubo demum paullo exserto.—Distributed as *I. fagifolia*, an obscure species (as to type) presumably related to *I. marginata*.

San Martín: Zepelacio, near Moyobamba, 1,100 meters, *Klug 3654*, type.

Inga aria Macbr., spec. nov.

Arbor 5 m. alta; ramulis junioribus pedunculisque breviter et molliter ferrugineo-pubescentibus; foliolis 5–7-jugis, subsessilibus (petiolo communi late alato) ovato- vel oblongo-lanceolatis, basi oblique subrotundatis, apice acute acuminatis, circa 8 cm. longis, 3.5 cm. latis, chartaceis, supra sparse scabro-hispidulis, subtus mediocriter dense pilosis praesertim ad nervos; nervis lateralibus supra obscuris, subtus prominulis; pedunculis geminatis ad 3 cm. longis; floribus sessilibus, calyce dense sericeo-strigoso 5 mm. longo, corolla conspicue et crispe villosa 2 cm. longa.—Resembles *I. dysantha* Benth., 626, of northern Brazil, with fewer lustrous leaflets and laxly flowered spikes. The corollas are nearly those of the related *I. cayennensis* Sagot with glabrate calyces typically pedicellate or rarely even subsessile (forma *sessiliflora* Ducke); Sagot's species, too, is more loosely hirsutulous. The shield-like wings to the petioles have suggested the name.

Loreto: Balsapuerto, *Klug 3111*, type.

Inga Augusti Harms, Repert. Sp. Nov. 16: 245. 1919.

Shortly branched, densely leafy, the younger somewhat reddish branchlets slightly angled, lenticellate, glabrous or nearly; leaflets 2–5 pairs (rachis rather conspicuously winged), the uppermost gradually larger, 5–7 cm. long, 2.5–3.5 cm. broad, mostly oblong-obovate, obliquely narrowed at base, shortly and bluntly acuminate or obtuse, chartaceous or subcoriaceous, glabrous; peduncles solitary or geminate, axillary, 2.5–5 cm. long; flowers umbellate, the glabrous pedicels 2–5 mm. long; calyx cupulate, obscurely denticulate, the margin sparsely puberulent, 1–2 mm. long; corolla glabrous except for the lobe-tips, 5–6 mm. long, the stamen tube included.—Tree to 7 meters high of evergreen montaña. F.M. Neg. 1135.

Huánuco: Between Chaglla and Muña, 2,500 meters, *Weberbauer 6705*, type. Yanano, *3723*.

Inga auristellae Harms, Notizbl. Bot. Gart. Berlin 6: 298. 1915.

Younger parts shortly villous-puberulent, the leaves soon glabrous; leaf-rachi narrowly winged, the gland patelliform; leaflets subsessile, 2–3 pairs, broadly elliptic or slightly obovate, obliquely obtuse at base, acutely or obtusely rather abruptly but shortly acuminate, coriaceous, lustrous above, reticulate-veined beneath, 4–10 cm. long, 2–6 cm. broad; spikes often geminate in the axils, shorter than the leaves, the peduncles 2–3.5 cm. long; bracts oblanceolate, 4–6 mm. long, sparsely hirsutulous, as also the calyx, this only 3–3.5 mm. long; corolla 7–8 mm. long, glabrous except at the shortly lobed tip, the stamen tube little if at all exserted.—Tree or shrub 5–15 meters high with white flowers and, according to Ducke, with flat pods (slightly raised over the seeds) curved, the sutures little dilated, 10–12 cm. long, about 2 cm. broad. F.M. Neg. 1136.

Río Acre: Seringal Auristella, *Ule 9426*, type. Brazil; Dutch Guiana.

Inga Bonplandiana Kunth in HBK. Nov. Gen. & Sp. 6: 288. 1824; 617.

Glabrous except for the pubescent thickened petiole and the silky-pubescent corollas, these twice as long as the tubular calyces; leaflets 5 pairs, elliptic-oblong, rounded or subcordate at base, acute, the terminal about 12 cm. long, half as broad, the lower gradually smaller, the lowest scarcely 5 cm. long, subcoriaceous, reticulate-veined beneath, lustrous above; rachis glabrous, bristle-tipped, winged, the wings 2 cm. broad, narrowed below, the glands orbicular, cupulate, sessile; flowers spicate, sessile; pods 5–10 cm. long, glabrous, the margins elevated.—Description after Kunth who according to Bentham saw only a leaf, his description of the flowers being drawn from Bonpland's notes. The species seems to be closely related to *I. chartacea*, if indeed it is not the same.

Cajamarca: Between Cavico and Chontali on the banks of the Río Chamaya, Prov. Jaén de Bracamoros, *Bonpland*, type. "Guabo."

Inga brachyrhachis Harms, Verh. Bot. Ver. Brandenb. 48: 159. 1907.

Glabrous shrub or tree to about 6 meters high, the branchlets gray-barked, obscurely lenticellate, the leaves with 2 pairs of broadly

oblong-elliptic subcoriaceous leaflets, their rachis emarginate, the rather large gland depressed; leaflets obliquely narrowed at base, obtusely short acuminate, reticulate-veined both sides, the larger 1.5–2 dm. long, 7–8 cm. broad; racemes rarely 1.5 cm. long, subsessile, borne from efoliose nodes below the leaves; pedicels 1 mm. long, the calyx 2 mm. long, both obscurely pulverulent; corolla white, 6–7 mm. long, the stamen tube more or less exserted.—F.M. Neg. 1138.

Loreto: Pongo de Cainarachi, *Ule 6361*, type. Mishuyacu, *Klug 623* (det. Harms).

Inga capitata Desv. Journ. Bot. 3: 71. 1814; 611.

Completely smooth with glossy coriaceous leaves, their rachis emarginate, their leaflets 2 pairs, nearly oblong, rigid-coriaceous, usually 7–15 cm. long, 3.5–6 cm. broad, contracted at base into petiolules 2–4 mm. long, shortly acuminate, pinnately nerved and reticulate-veined; stipules linear or linear falcate, caducous; peduncles axillary and subterminal or clustered, several cm. long, the ovoid spikes finally with rachis more than 2 cm. long; bracts minute, caducous; calyx cylindrical, finely striate, typically to 6 or 8 mm. long, the teeth short; corolla often about 12 mm. long, white, glabrous, the stamen tube included; pods thick, the margins slightly raised, straight or a little curved, sessile, glabrous, but densely lenticellate, 10–12 cm. long, about 3 cm. broad (Ducke).—Description after Bentham. Var. *latifolia* Ducke, Archiv. Jard. Bot. Rio Jan. 5: 120. 1930, is more robust in all parts, the leaflets to 21 cm. long, 11 cm. broad. *I. stipularis* DC., 610, has broad persisting stipules, greenish flowers 8 mm. long; *I. falcistipula* Ducke, l.c. 2: 56. 1918, is similar to the DeCandolle species and like it to be expected, but is much more slender in all parts, the stipules linear-falcate, scarcely subpersisting, and flowers at a different time. Different but keying here is *I. semiglabra* Pittier, Contr. U. S. Nat. Herb. 18: 186. 1916, of Ecuador, leaflets membranous, 3 pairs, flowers scarcely 10 mm. long, the calyx 5–6 mm. long; its relationship is with the Brazilian *I. leiocalycina* Benth., 612, also possibly extending into Peru, with corolla 8 mm. long, silky-villous all over, the glabrous calyx 4 mm. long. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 128*. F.M. Neg. 33442.

Loreto: Mouth of the Santiago, *Tessmann 4123* (det. Harms, "affine"). Yurimaguas, *Kuhlmann 17513* (type, var. *latifolia*).—Río Acre: *Ule 9914* (det. Harms, "var."); *9420*. Brazil.

Inga chartacea Poepp. & Endl. Nov. Gen. & Sp. 4: 79. 1845; 616. *I. calophylla* Harms, Notizbl. Bot. Gart. Berlin 6: 298. 1915.

Younger parts, especially the peduncles and leaves beneath on the prominent reticulate veins and nerves, sparsely hirsutulous with spreading, usually rusty trichomes; leaf-rachis usually broadly winged, the internodes 4–6 cm. long, the scutellate glands prominent; leaflets 2–3 pairs, subsessile or stoutly petiolulate, broadly oblong-elliptic, shortly narrowed to the truncate or subcordate base, acuminate, rigid chartaceous, glabrous and slightly lustrous above, the nerves impressed, the larger about 2 dm. long, nearly half as broad; peduncles fascicled, 2 cm. long or much shorter; spikes subglobose, about 1 cm. in diameter; calyx 2–3 mm. long, more or less puberulent, the trichomes scarcely appressed; corolla somewhat silky-strigose, 5–7 mm. long, the stamen tube included; pods 14–18 cm. long, 3–3.5 cm. broad, densely transversely lineate, straight or curved (Ducke, as *I. calophylla*).—Stipules according to Ducke (as *I. calophylla*) small, subpersisting, truncate at tip. Cf. *I. Bonplandiana*. *Klug 1319* seems to belong here as to leaves, pubescence, flowers, but the leaf-rachi are obscurely or not margined. *I. cyclocarpa* Ducke, Archiv. Jard. Bot. Rio Jan. 4: 14. 1925, is apparently more densely rusty-tomentulose, leaf-rachis only margined, the peduncles sometimes 3 cm. long, the flowers rather densely pubescent, the pods strongly arcuate, often nearly circinate. F.M. Negs. 1076; 1142 (*I. calophylla*).

San Martín: Chazuta, *Klug 4108* (distributed under an unpublished name after the locality).—Loreto: Yurimaguas, *Poeppig 2479*, type. Balsapuerto, *Klug 3087; 3092*. Mishuyacu, *Klug 1319*(?). Iquitos, *Tessmann 3563* (det. Harms, *I. Bourgoni*).—Río Acre: *Ule 9427* (type, *I. calophylla*). Bolivia; Brazil.

Inga cinnamomea Spruce ex Benth. in Mart. Fl. Bras. 15, pt. 2: 470. 1876.

Glabrous tree, the leaves with 3 pairs of oblong-elliptic leaflets, the flowers sessile in long peduncled heads; rachis emarginate, the glands small; leaflets shortly acuminate or rounded at tip, more or less cuneate at base (petiolule 4–6 mm. long), membranous-chartaceous, concolored, prominently pinnate-nerved and slenderly veined, the larger to 2 dm. long, 8 cm. broad; peduncles 5–8 cm. long, sometimes fascicled in short racemes at the nodes; flower-heads globose, the caducous bracts narrowly linear, shorter than the calyx, this (3) 5 mm. long, attenuate at base, shortly dentate, scarcely exceeded by the corolla; stamens white, the tube shortly exserted.—Stipules

foliaceous, more or less persisting according to Pittier. Flowers delightfully fragrant of cinnamon, the tree beautiful, 15 meters tall or taller (Spruce). Branches frequently inhabited by ants (*Pseudomyrma*), the fruit large (Ducke). Illustrated, Mart. l.c. *pl. 124.*

Río Acre: *Ule 9432* (det. Harms). Mouth of Río Macauhán, *Krukoff 5654*(?). Brazil. "Inga-assú."

Inga conferta Benth. in Hook. Lond. Journ. Bot. 4: 620. 1845; 630.

Branchlets, these angled, leaflets both sides and inflorescences except the silky-villous corollas finely puberulent; leaf-rachis and glands prominent; leaflets 5–6 pairs, oblong-elliptic, shortly acuminate, 1–3 dm. long, 5 cm. to about half as broad, subcoriaceous, prominently reticulate beneath, the conspicuous nerves only about 5 mm. distant; peduncles fascicled, the upper closely corymbose, only 1–2 cm. long, about equaled by the spikes; calyx 6 mm. long, the corolla 12–14 mm. long; stamen tube little if at all exserted.—The oblong-lanceolate bracts about 5 mm. long are caducous at anthesis. Cf. *I. scabriuscula* under *I. edulis.*

San Martín: Tarapoto, (*Mathews 1595*, type). San Roque, 1,400 meters, *Williams 7354* (det. Harms, *I. edulis*).—Junín: Chanchamayo Valley, 1,200 meters, *Schunke 399* (distr. as *I. scabriuscula*). "Guava."

Inga cordatoalata Ducke, Archiv. Jard. Bot. Rio Jan. 3: 53. 1922.

Glabrous, with bifoliate leaves, the petioles 1–2 cm. long, rather conspicuously wing-margined, with a sessile cupulate gland at apex; leaflets oblong-elliptic or obliquely ovate-oblong, obtusely acuminate, mostly 7–12 cm. long, 3–4.5 cm. broad, coriaceous, lustrous and obscurely veiny above, distinctly so beneath; racemes often binate in the axils or at the old defoliate leaf-nodes, shortly peduncled, 5 cm. long or longer, laxly flowered, the pedicels nearly 1 mm. long or shorter; calyx minute, less than 1 mm. long; corolla to 3.5 mm. long, the stamen tube not exserted; pods about 1 dm. long, 2 cm. broad, rounded at both ends, apiculate at tip, strongly impressed between the seeds, the margins nerviform.—Tree to 12 meters, the flowers white. F.M. Neg. 1144.

Loreto: Pumayacu, *Klug 3189* (det. Standl.). Brazil.

Inga coriacea (Pers.) Desv. Journ. Bot. 1: 71. 1814; 603. *Mimosa coriacea* Pers. Syn. Pl. 2: 262. 1807. *I. sertulifera* DC. Prodr. 2: 436. 1825.

Allied to *C. myriantha* but the peduncles and pedicels longer or at least very slender, the latter even thread-like and the leaf-rachis nearly or quite emarginate; leaflets 1 or 2 pairs, ovate, acuminate, lustrous, coriaceous, the larger 15 cm. long, half as broad, often much smaller; peduncles sometimes fasciculate; pedicels numerous, 8–15 mm. long, or longer; calyx about 2 mm. long, the corolla 8–10 mm. long, the stamen tube more or less exserted; pods subsessile to 10 cm. long, 2.5 cm. broad.—The var. **leptopus** (Benth.) Macbr., comb. nov. (*I. leptopus* Benth. in Hook. Lond. Journ. Bot. 4: 580. 1845; *I. sertulifera* var. *leptopus* Benth. Trans. Linn. Soc. 30: 603. 1875), has extraordinarily slender pedicels even 2.5 cm. long. Possibly the Peruvian material should all be referred to the variety; the young branchlets of the typical form are puberulent, lenticellate, the stamen tube scarcely exserted, the flowers somewhat smaller. To 10 meters tall, with slender columnar trunk, the bark with short horizontal ridges and numerous lenticels (Williams). Illustrated, Contr. U. S. Nat. Herb. 18: *pl. 86.* F.M. Neg. 28121.

San Martín: Tarapoto, *Williams 6800* (det. Harms). Lamas, *Mathews 1592.*—Loreto: Florida, *Klug 2318* (var.). Locality unknown, *Poeppig 2146.*—Río Acre: *Ule 9422* (or strongly affine, Harms). To the Guianas.

Inga cynometrifolia Harms, Verh. Bot. Ver. Brandenb. 48: 159. 1907.

Glabrous or nearly, with short often curved or tortuous branchlets; leaflets mostly 2 pairs, obovate-oblong, cuneately acute at base, obtuse or very shortly and obtusely acuminate, finally coriaceous, lustrous, 2.5–5 cm. long, 1–2.5 cm. broad; rachis slightly if at all margined; peduncles 2–3.5 cm. long, the pedicels 7–11 mm. long, puberulent or glabrous; umbels many-flowered; calyx 3–4 mm. long, the corolla 9–10 mm. long; stamen tube little exserted.—Separated by the author from *I. sciadion* Steud. by its essentially emarginate rachis and slightly puberulent inflorescence and from *I. umbellifera* Steud. by the smaller and less acuminate leaflets. It may be a variety of *I. tarapotensis.* F.M. Neg. 1146.

San Martín: Juan Guerra, *Ule 6452,* type. Chazuta, *Klug 4151.*

Inga densiflora Benth. Trans. Linn. Soc. 30: 617. 1875.

Doubtfully distinct from *I. chartacea* (or *I. Bonplandiana*) but as to type, the leaflets to 15 cm. long, 5 cm. wide or smaller, their internodes only 2–2.5 cm. long, the glands small; peduncles short,

corymbosely crowded at the apex of the branchlets, fasciculate on a rachis 5–7 cm. long; bracts 2 mm. long, persisting; calyx 3–4 mm. long, the sericeous corolla 8 mm. long; pods 3 dm. long, 5 cm. broad, thick, hard, transversely lineate.—Leaflets lustrous and subglabrous above, pubescent beneath. F.M. Neg. 1078.

San Martín: Near Tarapoto, *Spruce 4504*, type. Colombia?

Inga Donaeana Macbr., spec. nov.

I. Pavonianae partium omnium forma et dimensionibus similis differt foliolis supra sparse hirsutulis, subtus submolliter pilosis; calyce striato, dense adpresse striguloso haud setuloso; staminum tubo haud exserto.—Included by Bentham in *I. Pavoniana* but not at all that species as to pubescence of calyx; that of the leaves is softer. It seems necessary to accept a much wider range of variation in specific lines here or consider it as distinct. *Mathews 307, 1924* from Casapí may belong here (not seen). The pod (probably belonging here rather than to *I. Pavoniana*), presumably according to Bentham to be associated with this tree, was described as 7.5 cm. long, 2.5 cm. wide, glabrous, fleshy, the margins strongly elevated. F.M. Negs. 1104; 32060.

San Martín: Tarapoto, *Spruce 4503*, type.

Inga edulis Mart. Flora 20: Beibl. 2: 113. 1837; 630.

Usually small tree or sometimes attaining 16 meters, the branchlets, peduncles and leaf-rachi rusty-puberulent, the latter prominently wing-margined, the cupulate glands large; leaflets 4–6 pairs, oblong-elliptic, acuminate, the terminal 1.5 dm. long, about half as broad, membranous, minutely puberulent both sides, more densely so on the reticulate nerves and veins beneath; peduncles 2–4 cm. long, solitary in the upper axils or fasciculate and subcorymbose; flowers sessile, the puberulent tomentulose striate calyx 5–8 mm. long, the silky-villous corolla 14–20 mm. long; bractlets oblong-lanceolate, about 5 mm. long, caducous by full anthesis; pods often 3 dm. long or longer, about 1 cm. thick, subterete by the development of the multisulcate margins, the faces thus nearly covered.—Frequently cultivated near dwellings for the edible fruits and, according to Williams, common in thickets and wooded swamps. The following collections (det. Harms) match several made by Tessmann in Loreto. *I. scabriuscula* Benth., 629, has more open-faced pods, often smaller leaflets, the indument, fide Ducke, more persistent, the calyx more minutely puberulent; it seems to be doubt-

fully distinguishable in flower. Ducke, Leg. Amaz. Bras. 22. 1939, includes Peru in its range but I have seen no specimens that are not more probably *I. edulis* unless *I. conferta*, which compare, is the same. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 136*.

San Martín: Juan Guerra, 720 meters, *Williams 6896*.—Loreto: La Victoria, *Williams 2690*. Río Nanay, *Williams 273*. Pró, *Williams 1997*. Near Iquitos, *Killip & Smith 29869; Williams 7893*. Yurimaguas, *Williams 4223; Killip & Smith 27662*. To the Guianas and Central America. "Ingá cipó," "guaba," "pacay."

Inga Endlicheri (Kuntze) Macbr., comb. nov. *Feuilleea Endlicheri* Kuntze, Rev. Gen. 1: 185. 1891. *I. fasciculata* Poepp. & Endl. Nov. Gen. & Sp. 3: 79. 1845, not Willd. 1806.

Allied to *C. edulis* and marked chiefly by the softer short-pilose pubescence of the leaflets beneath and the smaller flowers, these only 8–11 mm. long; leaflets 4 pairs, broadly elliptic, acute, rounded at base, the larger 15 cm. long, half as broad; bracts ovate, 2 mm. long, subpersisting, the calyx about 5 mm. long; pods plane, compressed, finally glabrous, to 2 dm. long, 2.5 cm. thick with a sweet edible pulp, the consistency of cotton.—The lateral leaf nerves beneath are rather prominent, 8–10 mm. distant, the veins rather obscure. F.M. Neg. 1082.

Huánuco: Cuchero, *Poeppig 1340*, type. "Pacay amarillo."

Inga Feuillei DC. Prodr. 2: 433. 1825; 628. *I. Cumingiana* Benth. in Hook. Lond. Journ. Bot. 4: 616. 1845.

Young branchlets, leaf-rachi, inflorescences including the calyces and pods densely rusty pubescent with a short tomentose-villous indument; rachis wings rather prominent, the glands scarcely so; leaflets 3–5 pairs, oblong-elliptic, obliquely rounded at base, acuminate, finely reticulate, sparsely hirsutulous above, or the midnerve usually rusty-villous, hirsute-villous on the nerves and veins beneath, subcoriaceous, the larger terminal ones 1–2 dm. long, about 8 cm. broad; peduncles axillary, 4–11 cm. long, the spikes to 3 cm. long; bracts linear, shorter than the calyx, mostly persisting until after anthesis; calyx tubular, 8–10 mm. long with short acutish teeth; corolla densely sericeous-villous, 17 mm. long, or slightly longer, the stamen tube included; pods flat, 2 to several dm. long, about 2 cm. broad with dilated obscurely bisulcate margins.—Becoming a large tree with spreading crown.

As noted by the first collector, commonly planted in Lima for shade and for the pods which under the name of "pacai" are much

appreciated for the succulent sweet pulp about the seeds; this according to Ruiz & Pavón is like white cotton, juicy and sweet, of pleasant flavor and is much esteemed by the fair sex because *real de pacai* serves for entertainment at the holidays. Pittier, Contr. U. S. Nat. Herb. 18: 197. 1916, pointed out the real identity of DeCandolle's species and most of the many references given by Weberbauer probably refer to *I. adenophylla*, the species in a strict sense apparently being confined to Lima and vicinity. It commemorates the French priest Louis Feuillée whose three volume *Journal des Observations Physiques, Mathematiques et Botaniques* was the first scientific account of the plants of Peru. He lived in Peru and Chile from 1709 to 1711.

Lima: Chosica, *502*. Near Lima, *Feuillée*, type; *Raimondi; Cuming 980* (type, *I. Cumingiana*).—Cuzco: Santa Ana, in coca field, 900 meters, *Cook & Gilbert 1573*, fide Pittier. "Pacai."

Inga graciliflora Benth. Lond. Journ. Bot. 4: 582. 1845; 603.

Similar to *I. coriacea;* branchlets slender, puberulent or glabrate as also the emarginate leaflets; leaflets 3 pairs, oblong-elliptic, the larger 1.5 dm. long, half as broad, somewhat puberulent on the nerves beneath, firm chartaceous; umbels lateral, subsessile or the puberulent peduncles to 10 mm. long, the pedicels about half as long; flowers typically slightly puberulent, the calyx scarcely 1 mm. long, the corolla 6 mm. long, the stamen tube long-exserted.—The Peruvian form may be known as var. **peruviana** Macbr., var. nov., foliis praecipue ad nervos puberulis, late ellipticis. *Williams 684*, type. About 15 meters with spreading crown, uncommon in dense forests (Williams). F.M. Neg. 28114.

Loreto: Río Itaya, *Tessmann 5214* (det. Harms). Río Nanay, *Williams 684*. British Guiana.

Inga heterophylla Willd. Sp. Pl. 4: 1020. 1806; 602. *I. umbellata* G. Don, Gen. Syst. 2: 391. 1852.

Shrub or small tree, glabrous, the densely leafy branchlets slender; leaflets 1–2 (3–4) pairs, oblong-lanceolate, gradually acuminate, coriaceous, lustrous, the larger 5–7 cm. long; peduncles 5–15 mm. long, the pedicels 4–8 mm. long; calyx scarcely 1 mm. long, the corolla 5–6 mm. long, the stamen tube more or less exserted; pods shortly stiped to 12 cm. long or longer, 1–2 cm. broad; rachis obscurely if at all margined.—*I. mapiriensis* Pittier, Contr. U. S. Nat. Herb. 18: 174. 1916, has, in type from Bolivia, calyx 2.5–3 mm. long,

corolla 7–8 mm. long; in other material the distinction is not marked. *I. Duckei* Huber, Amazonian, Bol. Mus. Goeldi 5: 375. 1909, if sought here may be known by its subsessile flowers and large pods only 4–5 cm. long; the rachis of the capitate inflorescences is 4–10 mm. long (Ducke). F.M. Negs. 1087; 23029.

San Martín: Tarapoto, *Spruce 4583*. Near Moyobamba, *Klug 3521*.—Junín: San Ramón, *Killip & Smith 24798*.—Ayacucho: Choimacota Valley, evergreen bush-wood, 1,400 meters, *Weberbauer 7541*. To the West Indies.

Inga hirsutissima Rusby, Bull. N. Y. Bot. Gard. 4: 349. 1907. *I. chrysotricha* Pittier, Contr. U. S. Nat. Herb. 18: 202. 1916.

Strikingly hirsute with spreading yellow trichomes, only the membranous striate broad persisting stipules and bracts and the strongly toothed calyces lightly so or even glabrate; leaf-rachis winged with paired or confluent glands between the 1–5 pairs of leaflets, these ovate-oblong, subsessile, rounded at base, acutely acuminate, membranous, the larger to 12 cm. long, half as broad, the basal pair about a third as large; peduncles solitary or geminate, usually several cm. long, the spikes ovoid; calyx 7–14 mm. long, or somewhat longer, the teeth narrowly ovate or linear-oblong; corolla 15–20 mm. long, densely villous, the stamen tube included; pods about 2 dm. long, 4 cm. broad, stiped, rounded and cuspidate at tip, densely golden-hispid.—Pittier's species was separated chiefly on the basis of larger flowers, the calyx to 16 mm. long or slightly longer, the corolla to 22 mm. long, while the equivalent dimensions for Rusby's plant are scarcely 7 mm. and 16 mm.; however, these differences it seems to me do not hold nor as shown by examination of cotype sheets is there any constancy in the confluence and separation of the rachis glands.

Cuzco: Lucmayo Valley, *Cook & Gilbert 1390* (det. Pittier, *I. chrysotricha*). Bolivia. "Pacay."

Inga ingoides (Rich.) Willd. Sp. Pl. 4: 1012. 1806; 631. *Mimosa ingoides* Rich. Act. Soc. Hist. Nat. Paris 1: 113. 1792.

Tree, the angled branchlets and peduncles reddish-brown or rusty tomentose-puberulent; leaf-rachis broadly winged, the glands orbicular, rather conspicuous, the leaflets usually 4–5 pairs, broadly elliptic, rounded at base, shortly acuminate, the larger 15 cm. long, 8–10 cm. broad, the lowest pair less than half as large, finally subcoriaceous, puberulent above, rather softly pubescent beneath;

peduncles 1–3 cm. long, solitary or fascicled in axillary racemes and subtended by subpersisting bracts; racemes about 3 cm. long, the small oblong bracts caducous, the pedicels 3–8 mm. long; calyx about 8 mm. long, 5 mm. broad, the corolla 12–14 mm. long, silky-villous; stamen tube included; pods similar to those of *I. edulis* but nearly twice as thick according to Pittier.—Sometimes over 20 meters tall with straight columnar trunk, the bark light-colored with short horizontal fissures (Williams). Illustrated, Kunth, Mimoseae, *pl. 14;* Contr. U. S. Nat. Herb. 18: *pl. 105* (fruit).

Loreto: La Victoria, *Williams 2694.* Río Itaya, *Williams 3293.* To the West Indies and Central America. "Shimbillo."

Inga Killipiana Macbr., spec. nov.

Arbor 5 m. alta; ramulis junioribus petiolis pedunculisque dense fulvo-villoso-tomentosis; foliolis 4-jugis petiolulatis (petiolo communi haud marginatis, glandulis conspicuis cupuliformis) obovatis apice abrupte acutis, ad 14 cm. longis, 7 cm. latis, subcoriaceis, supra leviter subadpresse hispidulosis, margine (et costa media praesertim ad basin) conspicue fulvo-villosis, subtus imprimis ad nervos subadpresse pilosis, venulis tenuiter reticulatis; pedunculis solitariis, 3–6 cm. longis; spicis ovoideis, 3 cm. longis; bracteis caducis; floribus sessilibus, calyce sparse hispidulo-setuloso, 10 mm. longo; corolla 17 mm. longa, flava, dense sericeo-strigosa; filamentorum tubus haud exsertus.—Related to *I. peltadenia* and *I. setifera. I. rhabdotocalyx* Harms, Repert. Sp. Nov. 13: 526. 1915, Ecuadorian, is similar but the pubescence is hirsutulous.

San Martín: Zepelacio, near Moyobamba, 1,100 meters, *Klug 3743,* type.

Inga Klugii Standl., in herb.

Arbor, 7 m. alta, glabra; foliolis 2 jugis breviter petiolulatis (petiolo communi haud marginato) late ellipticis vel subobovatis paullo ad basin oblique angustatis, apice rotundatis, apiculatis vel obtusis, ad 18 cm. longis, 10 cm. latis subcoriaceis, vix nitidulis supra obscure subtus distincte tenuiterque reticulato-venosis; spicis sessilibus (vel fere) solitariis vel geminatis, axillaribus vel supra axillaribus, 1–5 cm. longis; bracteolis minutis ut videtur caducis; floribus sessilibus, calyce obscure pulverulento vix 1 mm. longo, corolla (vel lobis plus minusve exceptis) glabra 5 mm. longa, staminum tubo longe exserto.—Suggests *I. Bourgoni* (Aubl.) DC. of the Guianas,

a species with margined petioles, usually peduncled and fascicled spikes with somewhat larger flowers. Flowers cream-colored (Klug).

San Martín: Chazuta, 260 meters, *Klug 4112*, type.

Inga lallensis Spruce ex Benth. Trans. Linn. Soc. 30: 603. 1875.

Glabrate or the branchlets early minutely puberulent, otherwise glabrous; stipules small; rachis emarginate with 3–4 pairs of oblong elliptic acuminate leaflets; flowers white in densely flowered axillary geminate long-peduncled umbels; leaflets acute at base, the larger 1.5 (2) dm. long, 5 (9) cm. broad, finally chartaceous, slightly or not at all lustrous; peduncles 6–12 cm. long, the pedicels to 4 mm. long; calyx 2 mm. long, the corolla about 7 mm. long; stamen tube slightly exserted.—Attains 12 meters. The Schunke specimen has lustrous subcoriaceous ample leaflets, corollas 7–9 mm. long; cf. *I. tenuistipula* and note. *I. inundata* Ducke, Archiv. Jard. Bot. Rio Jan. 3: 48. 1922, has corolla 10–12 mm. long, the peduncles only 2–4 cm. long.

Loreto: Río Mazán, *José Schunke 257* (distr. as *I. umbratica*). Woods above Lalla, eastern Peru, (*Spruce*, type). "Shymbillo."

Inga lateriflora Miq. in Linnaea 19: 131. 1845; 602.

Similar to *I. myriantha* but typically with subequal pedicels and calyx, each only 1 mm. long; corolla 4–5 mm. long; peduncles to 1.5 cm. long; leaflets 2–3 pairs, coriaceous, lustrous, lanceolate or ovate-oblong, obtusely acuminate, acute at base, the larger 5–7.5 cm. long, about 2.5 cm. broad; umbels mostly 2 to several, racemosely disposed on short branchlets or sometimes fascicled; stamen tube long-exserted; pods shortly stiped, to 15 cm. long, 12 mm. broad, glabrous.—Several Peruvian collections have been referred to this species; cf. *I. myriantha*. *I. obidensis* Ducke, and var. *pilosa* Ducke, both Archiv. Jard. Bot. Rio Jan. 9: 49. 1922, found as near Peru as the Río Purús, have broader leaflets, flowers about a third larger. F.M. Neg. 1089.

Peru (perhaps). Brazil to Surinam.

Inga laxiflora Benth. in Hook. Lond. Journ. Bot. 4: 617. 1845; 631.

Reddish velutinous on the younger parts and calyces as *I. ingoides*, but the leaflets oblong-elliptic, the larger 8 cm. long, 2.5 cm. broad, the peduncles about 6 cm. long supporting a laxly flowered raceme

nearly as long; leaflets in age somewhat lustrous and hirsutulous on both sides; bracts oblong-linear, caducous; pedicels 2–4 mm. long, calyx 8 mm. long, the corolla 18 mm. long; stamen tube slightly exserted.—F.M. Neg. 28120.

Peru: Sesuya, *Mathews 3274*, type.

Inga lineata Benth. in Hook. Lond. Journ. Bot. 4: 594. 1845; 613. *I. monzonensis* Harms, Bot. Jahrb. 42: 88. 1908.

Branchlets, petioles and peduncles densely rusty-puberulent with short, somewhat spreading firm trichomes; rachis emarginate, the glands large, sessile, cupulate, the terminal bristle subpersisting; leaflets 3–4 pairs, ovate or oblong-elliptic, obliquely narrowed to the obtuse or rounded base, acuminate, the largest 15 cm. long, nearly half as broad, lustrous and slightly reticulate-veined above, appressed strigillose both sides especially on the midnerve and prominent but slender parallel lateral nerves beneath, these also clearly marked above; peduncles fascicled in the axils, 1–3 cm. long, the upper shortly panicled, the rather laxly flowered spikes about 2 cm. long; bracts minute, subpersisting; calyx sparsely appressed puberulent, 3 mm. long; corolla 4–5 mm. long, silky-strigose, the stamen tube included or shortly exserted.—F.M. Neg. 28123 (*I. monzonensis*).

San Martín: Tarapoto, *Mathews 1594*, type. Near Moyobamba, 1,100 meters, tree 20 meters, the flowers cream-colored, *Klug 3695* (det. Standl., *I. punctata*).—Huánuco: Between Monzón and the Río Huallaga, 600 meters, *Weberbauer 3644* (type, *I. monzonensis*).

Inga longipes Benth. Trans. Linn. Soc. 30: 617. 1875.

To 8 meters high with spreading crown, the ample leaflets beneath and peduncles shortly and softly rusty-tomentose; leaf-rachis wings 1–2.5 cm. broad, the glands depressed; leaflets 3–4 pairs, about 2 dm. long, half as wide, subcoriaceous, impressed, reticulate-veined above and glabrate except for the densely pubescent midnerve; spikes oblong, 4–7 cm. long on peduncles as long or longer, the almost minute bracts caducous after anthesis; calyx glabrous, finely striate, 12 mm. long, the silky-villous corolla about twice as long; stamen yellowish-green, the tube included.—The Williams collection was determined by Harms as *I. velutina;* the immature pods showing a strigose calyx are strongly curved, 10 cm. long, nearly 2 cm. broad, the faces nearly closed by the flat enlarged margins, densely rusty-tomentose. F.M. Neg. 1094.

San Martín: Tarapoto, *Spruce 4935*, type. Juanjuí, *Klug 4381*.—Loreto: Santa Rosa, *Williams 4777*(?). "Rosea-shimbillo."

Inga lopadadenia Harms, Notizbl. Bot. Gart. Berlin 10: 178. 1927.

Tree, the glabrous branchlets densely lenticellate, angulate, the leaf-rachis glands conspicuous, orbicular, cupulate, the leaflets 3 or 4 pairs, shortly petiolulate, elliptic, sometimes broadly so, even to 9 cm. wide and twice as long, usually a third smaller, slightly oblique at the rounded base, shortly acuminate, glabrous, subcoriaceous, the lateral nerves slightly impressed above, prominent beneath; spikes axillary, geminate or solitary or sometimes fascicled on short branchlets, many-flowered, 7–12 cm. long, puberulent; calyces subsessile, about 1 mm. long, puberulent as the corolla, this 4–4.5 mm. long, the stamen tube little exserted.—Type 8 meters high, in flood-free woods, the flowers greenish, somewhat fragrant (Tessmann); flowers white (Klug). F.M. Neg. 1154.

Loreto: Near Iquitos, *Tessmann 5121*, type; *Klug 1154* (det. Harms). Florida, *Klug 2128*. "Mitiño."

Inga loretana Macbr., spec. nov.

Arbor 8 m. alta; ramulis teretibus junioribus pedunculisque paullo puberulentis demum glabratis; foliolis 4–5 jugis crasse petiolulatis (petiolo communi nudo) late ellipticis, 10–16 cm. longis, 4.5–7.5 cm. latis, cuspidatis, basi suboblique rotundatis, rigide chartaceis, glabris, vix nitidulis, praecipue subtus reticulato-venosis; pedunculis ut videtur plus minusve paniculatis interdum 5 cm. longis; floribus capitatis evidenter pedicellatis (pedicellis ad 2.5 mm. longis) calyce minute puberulento, vix striato circa 6 mm. longo, corolla breviter adpresseque strigosa circa 12 mm. longa.—Flowers white; bracts small, caducous; rachis glands orbicular, sessile, moderately large. There is only one ovoid head developed.

Loreto: Mishuyacu, *Klug 1308* (type, U. S. Nat. Mus.).

Inga macrophylla Humb. & Bonpl. ex Willd. Sp. Pl. 4: 1015. 1806; 622. *I. calocephala* Poepp. & Endl. Nov. Gen. & Sp. 3: 78. 1845, fide Benth.

Tree with flexuous angled branchlets, ample bright green leaves consisting of 3–4 pairs of broadly oval leaflets, and geminate or fasciculate peduncled ovoid spikes of white flowers with glabrous calyces, lustrous-villous elongate corollas and many white long-

exserted stamens; stipules rotund ovate, often 1 cm. broad and as long or longer, persisting; leaf-rachis broadly winged, the cupulate glands prominent; leaflets shortly acuminate, rounded at base, usually 2 dm. long or longer, half as wide, chartaceous, lustrous above, paler beneath, slightly hispidulous on the nerves, these prominent, the veins reticulate; peduncles hispidulous or glabrate, 2–6 cm. long, the ovoid spikes persistently bracted, the bracts about 6 mm. long, half as broad; calyces tubular, striate, to 15 mm. long, sometimes with a few trichomes, the corolla finally 4 cm. long; stamen tube included as to Peruvian specimens.—Pods large to 4 dm. long, 4.5 cm. wide, the hispidity disappearing in age except along the strongly dilated margins; common in the Amazon region in argillaceous non-inundated soils and often cultivated for the very pulpy fruits (Ducke). F.M. Neg. 1090.

San Martín: Pongo de Cainarachi, *Klug 2673*.—Loreto: Yurimaguas, *Poeppig 2111* (type, *I. calocephala*). Near Iquitos, *Klug 89* (det. Harms). Contamaná, *Killip & Smith 26871*. Bolivia to Venezuela.

Inga marginata Willd. Sp. Pl. 4: 1015. 1806; 608. *I. excelsa* Poepp. & Endl. Nov. Gen. & Sp. 3: 78. 1845. *I. pycnostachya* Benth. in Hook. Lond. Journ. Bot. 4: 589. 1845. *I. odorata* G. Don, Gen. Syst. 2: 388. 1832(?).

Usually a medium-sized glabrous tree or the slender lenticellate branchlets apically somewhat rusty-puberulent as also the more or less margined leaf-rachi and spikes including the almost minute calyces, these barely 1 mm. long; leaflets 2 (3) pairs, oblong-lanceolate, or oblong-elliptic, ordinarily 7–12 cm. long, 2.5–4 cm. broad, or on vigorous shoots the terminal at least larger, obliquely acute at base, acuminate, chartaceous in age; glands sessile, cupulate; spikes very shortly peduncled, solitary or geminate, often 7 cm. long or longer, the bracts small, persisting or more or less promptly caducous; flowers sometimes minutely and obscurely pedicellate, white, fragrant, the corolla glabrous or nearly, 4 (5) mm. long, the staminal tube typically exserted but in some forms not at all; pods flat, to 12 cm. long, 1.5–2 cm. broad, rounded at both ends, apiculate at tip, striate-veined, glabrous, the margins nerviform.—Variable; *Williams 92* may be designated var. **itayensis** Macbr., var. nov., corollis ad 6 mm. longis. *I. fagifolia* (L.) Willd., 607, as it has been interpreted, is very similar if indeed specifically distinct. Hassler, Repert. Sp. Nov. 16: 154. 1919, proposed *I. fagifolia* var. *marginata* (Willd.) Hassl., and other variants, interpreting the Linnean plant

as having generally larger leaflets, corollas to 6 mm. long, and his action would be accepted except that probably *I. fagifolia* L. and *I. fagifolia* of authors are not the same; cf. *I. yacoana.* Sometimes nearly 20 meters high, the crown flat or spreading (Williams). Specimens determined by Harms except as indicated. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 125.* F.M. Negs. 1091; 32057.

Cajamarca: Hacienda de Niñabamba, Prov. de Chota, (*Raimondi*). —San Martín: Juanjuí, *Klug 3793* (det. Standl.). Pongo de Cainarachi, *Klug 2669* (det. Standl.).—Huánuco: Casapí, *Mathews 1922.* Cuchero, *Poeppig 1335* (type, *I. excelsa*).—Junín: Colonia Perené, *Killip & Smith 25133* (det. Standl.). La Merced, *5427.* Vitoc, (*Raimondi*).—San Martín: Moyobamba, (*Mathews,* type, *I. pycnostachya*); *Weberbauer 4768;* 288.—Loreto: Río Itaya, *Williams 9; 92* (det. Harms, var.). Santa Rosa, *Williams 4927.* Yurimaguas, *Williams 4217.* La Victoria, *Williams 3184.* Río Nanay, *Williams 499.*—Río Acre: Near mouth of Río Macauhán, *Krukoff 5310*(?). Locality unknown, *Ruiz & Pavón.* Bolivia to Central America. "Huaro," "uscopacay," "shimbillo," "colorado," "pacay del monte."

Inga Mathewsiana Benth. in Hook. Lond. Journ. Bot. 4: 594. 1845; 594.

Small or medium-sized tree with 5–6 foliolate leaves and clustered peduncles bearing subglobose heads of white flowers in the upper axils or at the ends of leafy puberulent or shortly villous branchlets; stipules ovate-lanceolate; leaf-rachis emarginate, the circular glands depressed; leaflets oblong, usually somewhat elliptic, shortly acute at base, more or less acuminate, those of the flowering branchlets ordinarily about 10 cm. long, 3–4 cm. broad, or apparently as interpreted here to 3 times as long as broad, subcoriaceous, scarcely lustrous, moderately reticulate both sides and glabrate unless obscurely puberulent on the veins; bracts 2 mm. long, subpersisting; calyx 5–6 mm. long, appressed puberulent; corolla 10–12 mm. long, silky-pilose, the stamen tube included, or apparently sometimes shortly exserted; pods (as to *Rusby 996,* det. Pittier) 6 cm. long, 2.5 cm. broad, several mm. thick, the margins little thickened, glabrous. —My *5797* in fruit has pod 7.5 cm. long, 2 cm. broad, obtuse at each end, evanescently puberulent and may belong here but the mature leaves are rather densely and crisply pilose beneath. This includes as described *I. nobilis* (which compare) in large part as to Peru. *I. olivacea* Sprague, Trans. Bot. Soc. Edinb. 22: 430. 1904, of Colombia, found, according to Britton & Killip, as near as the Río Putumayo,

has very slender, sparsely setulose calyces and corollas. Flowers faintly fragrant, borne in such profusion that the tree crown seems white (Woytkowski). F.M. Neg. 28126.

San Martín: Pongo de Cainarachi, *Klug 2722*. Rioja, 900 meters, *Woytkowski 23* (det. Standl., *I. nobilis*). Moyobamba, *Mathews*, type.—Junín: La Merced, *5797*(?).—Loreto: Río Mazán, *José Schunke 39* (det. Standl.). Above Rancho Indiana, overflowed bank, *Mexia 6407* (det. Standl., *I. nobilis*). Bolivia. "Shimbillo."

Inga maynensis Benth. Trans. Linn. Soc. 30: 613. 1875.

Branchlets, petioles and peduncles densely reddish-tomentulose; stipules short, ovate, caducous; leaf-rachis emarginate, the glands orbicular, sessile, small or rather large; leaflets subsessile, 2 pairs, oblong-elliptic or broadly elliptic, slightly narrowed to the obtuse base, abruptly and very shortly acuminate, mostly about 10 cm. long, half as broad, coriaceous, glabrous and lustrous above, the prominent parallel nerves beneath as the midnerve more or less densely fulvous-pubescent, the fine veins glabrate; peduncles axillary, 2–3 cm. long, the spikes subcapitate with rachis only 4–6 mm. long, the minute bracts often caducous; calyx closely and minutely puberulent, obscurely striate, 6 mm. long; corolla silky-strigose, 12–14 mm. long, the stamen tube included; pods sessile, strongly oblique at base, plane, glabrous, the margins scarcely elevated, 1.5 dm. long or longer, 2.5 cm. broad.—Bentham referred with query to the closely related *I. rufinervis* Spruce, 612, a specimen by Spruce from Yurimaguas which it seems probable should be included here; it is not clear anyway that there is any fundamental distinction between the species. F.M. Neg. 32058.

Loreto: Yurimaguas, *Poeppig* (Herb. Vienna, type); also *Spruce*, same locality, cf. note above. Brazil?

Inga microcoma Harms, Notizbl. Bot. Gart. Berlin 6: 301. 1915.

Glabrous except for the puberulent, shortly peduncled axillary spikes which identify the species readily by their slenderness, the flowers only 3–4 mm. long and, at least as to type, fully equaled by the oblanceolate bracts; leaf-rachis narrowly margined with 2 pairs of subsessile leaflets, these oblong-elliptic or slightly obovate, obtuse or acute at base, rounded or shortly acuminate at apex, 3.5–10 cm. long, 2–4.5 cm. broad; spikes shortly peduncled, 4 cm. long or longer; calyx 1–1.5 mm. long.—Tree 20 to 30 meters high, the flowers white.

The Krukoff specimen has laxly flowered spikes, the bracts apparently shorter than the calyces but these are not yet fully developed. F.M. Neg. 1156.

Río Acre: Seringal San Francisco, *Ule 9431*. Mouth of Río Macauhán, *Krukoff 5392*. Brazil?

Inga myriantha Poepp. & Endl. Nov. Gen. & Sp. 3: 77. *pl. 289*. 1845; 601.

Tree, recorded to 10 meters high, glabrous except for a minute and sparse pubescence on the young leaves and umbellate inflorescences; branchlets terete or nearly, lenticellate; stipules linear, caducous or subpersisting; leaflets 2 pairs, the rachis broadly and obcuneately winged, the blades oblong-elliptic, acuminate, the upper about 12 cm. long, 4 cm. broad, the lower pair half as large, lustrous, reticulate-veined both sides, coriaceous; glands orbicular, scutellate; umbels axillary on short branchlets, the peduncles 3–4 cm. long, the slender pedicels (4) 10–18 mm. long; bracts subulate; calyx 3–5 mm. long, dentate, the slender greenish corolla 10 mm. long; stamens white, their tube included or scarcely exserted.—Illustrated, Contr. U. S. Nat. Herb. 18: *pl. 85*. F.M. Neg. 1097.

San Martín: Chazuta, *Klug 4152* (distr. as *I. lateriflora*). Near Moyobamba, *Klug 3692* (distr. as *I. lateriflora*).—Junín: Chanchamayo Valley, 1,500 meters, *Schunke 1611; 1812*.—Loreto: Yurimaguas, in dense woods, *Poeppig*, type. Near Iquitos, *Klug 2522* (distr. as *I. lateriflora*). Mouth of Río Santiago, *Tessmann 4135* (pedicels 3–4 mm. long; det. Harms, *I. umbratica*, pedicels shorter).—Locality unknown, *Mathews 1593*. To the Guianas.

Inga nobilis Willd. Enum. Hort. Berol. 1047. 1809; 614.

In general like *I. punctata* and *I. Ruiziana*, but, at least as to type, with pedicellate flowers, the pedicels to 1 mm. long; leaflets 3–4 pairs, ovate or oblong-elliptic, acuminate, subchartaceous, glabrous except on the nerves and veins beneath, the latter commonly reticulate both sides; rachis emarginate, usually bristle-tipped, the glands small; peduncles to 6 cm. long, the racemes scarcely 1.5 cm. long; calyx 5 mm. long, the corolla at least typically only 8 mm. long; pods 1–1.5 dm. long, 2 cm. broad, the margins thickened.—Apparently rare in Peru or more probably the species is variable and the diagnosis should be drawn to include forms treated as related species. Simulates some forms of *I. quaternata*. *I. Rusbyi* Pittier, Contr. U. S. Nat. Herb. 18: 179. 1916, Bolivian, would key here;

the spikes at anthesis are globose, bracts persisting, flowers sessile, the glabrate calyx 5–6 mm. long, the corolla appressed silky strigose toward tip, 8–9.7 mm. long. *Klug 3259* simulates *I. Mathewsiana* but for the pedicelled shorter flowers. In Dahlem *Tessmann 3875* and *371* from Loreto, the corollas about 10 mm. long, have been referred here. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 129.* F.M. Neg. 1101.

San Martín: Near Moyobamba, *Klug 3259* (det. Standl.).—Junín: La Merced, *Killip & Smith 23485*(?).—Loreto: Middle Ucayali, *Tessmann 3281* (det. Harms, *I. punctata* affine). Yurimaguas, *Killip & Smith 28148.*—Río Acre: (*Kuhlmann 17517*, det. Ducke). Brazil to Colombia and the Guianas.

Inga obscura Macbr., spec. nov.

Arbor, 10 m. alta; ramulis inflorescentiisque dense rufo-tomentosis; foliolis 3–4 jugis petiolulatis (petiolo communi haud marginato) obovatis, basi acutis, apice obtusis vel breviter acutis ad 17 cm. longis, 8 cm. latis, coriaceis, supra nitidis, glabris, nervis impressis, subtus nervis et venulis prominenter reticulatis plus minusve longe hirsutulis; pedunculis fasciculato-paniculatis (vel axillaribus?), 3 cm. longis; spicis densis 2 cm. longis, floribus sessilibus; corolla 7 mm. longa, puberulo-strigosa calycem plus duplo excedente, staminum tubo haud exserto.—Suggests *I. juglandifolia* Willd. and *I. nobilis* Willd. (under which name it was distributed) both with veins conspicuous both sides, the leaflets of the former acuminate, the corolla villous, the flowers of the latter pedicellate. The petiole glands as in *I. juglandifolia* are obscure.

San Martín: Zepelacio, near Moyobamba, 1,100 meters, *Klug 3690*, type.

Inga Pardoana Harms, Bot. Jahrb. 42: 89. 1908.

Similar to *I. quaternata* but the leaflets merely acute and only shortly narrowed well above the middle portion but long-narrowed to base; corolla more flaring at tip.—As noted by Harms, *I. boliviana* Britton, Bull. Torrey Club 17: 9. 1890, and *I. Wittiana* Harms, Verh. Bot. Ver. Brandenb. 48: 161. 1907, the latter of Brazil, and, fide Ducke, Río Acre, are closely allied but the author suggests *I. Pardoana* is distinct from both in the somewhat thicker larger flowers (9–10 mm.), denser pubescence, and, especially, in the scarcely if at all acuminate leaflets, stamen tube obscurely or very shortly exserted. In *I. Wittiana*, fide Harms, the tube is strongly

exserted, the bracts a little smaller. *I. Pardoana* suggests the Peruvian form of *I. nobilis* except that the veins are obscure above and the flower-rachis short. Only more collections will prove the specific importance of these differences. Named for the former President Pardo of Peru. F.M. Neg. 1162.

Huánuco: Pampayacu, *Kanehira 211.*—Junín: Near Huacapistana, 1,500 meters, *Weberbauer 2339*, type; 252.

Inga Pavoniana G. Don, Gen. Syst. 2: 388. 1832; 623.

Somewhat rusty-hirsutulous at least the branchlet tips, peduncles and prominent leaf-nerves and veins beneath; leaf-rachis narrowly winged with 3–4 pairs of oblong-obovate, acutely acuminate leaflets, about 15 cm. long, 6 cm. broad, sparsely subappressed pubescent above; peduncles axillary, 4 cm. long or longer, the ovoid spike to 6 cm. long with linear bracts 1 cm. long persisting after anthesis; calyx finely striate, 12 mm. long, sparsely reddish-setulose; corolla appressed silky-villous, 3.5 cm. long, the stamen tube little if at all exserted; pods about 1 dm. long, 2.5 cm. thick, fleshy, the margins strongly elevated.—The pod seen by Bentham, which he suggests might not belong to the species, was glabrous; that of Weberbauer is 7 cm. long, 2 cm. broad, 1.5 cm. thick, deeply sulcate by the elevated margins, lightly rusty-hirsutulous, and was referred by Harms to *I. Hartii* Urb. Symb. Ant. 1: 311. 1899, of Trinidad as a "var." which may be correct but Urban's species seems to be known only from Trinidad to this day, is less pubescent and has glabrous (or nearly) pods 2.5–4 cm. broad. F.M. Neg. 29422.

Huánuco: Chinchao, *Ruiz & Pavón*, type; *Raimondi.* Casapí, (*Mathews 307; 1924*, fide Bentham).—Junín: La Merced, *Weberbauer 931;* 282.

Inga peltadenia Harms, Verh. Bot. Ver. Brandenb. 48: 160. 1906. *I. Thibaudiana* DC. Prodr. 2: 434. 1825, var. *latifolia* Benth. in Mart. Fl. Bras. 15, pt. 2: 480. 1876.

Branchlets more or less rusty-tomentulose; leaf-rachis emarginate, the glands large, peltate, with 3–5 pairs of shortly petiolulate, broadly and obliquely elliptic leaflets, rounded at base, shortly acuminate, 7–12 cm. long, 4–8 cm. broad, subcoriaceous or chartaceous, lustrous above, sparsely puberulent, especially on the midnerve, densely villous and conspicuously veined beneath; spikes fascicled in the axils or panicled, shortly villous or the tubular calyx merely puberulent, 4–4.5 mm. long; corolla densely silky-

villous, 15–19 mm. long or somewhat longer; pods (fide Pittier) straight or nearly, flat, rounded at base, apiculate, fulvous pubescent, the margins elevated, nearly 2 dm. long, 2 cm. broad.—As remarked by Harms, very closely related to *I. Thibaudiana* DC. and perhaps only a variety but the Peruvian plants are more densely pubescent; *Spruce 4915*, var. *latifolia* Benth., is apparently Harms' species and the flowers on the particular specimen seen by me are not any larger, but a certain variation is of course to be expected. Ducke, Leg. Amaz. Bras. 18. 1939, refers these specimens to *I. rubiginosa* (Rich.) DC. of the Guianas and adjacent Brazil, typically with more velvety tomentum, larger leaflets, the corolla-pubescence densely tangled instead of merely silky with straight or nearly straight trichomes. F.M. Neg. 1163.

San Martín: Tarapoto, *Ule 6451*, type; *Spruce 4915*.—Loreto: Yurimaguas, *Killip & Smith 29049*. Bolivia; Ecuador?

Inga plumifera Spruce ex Benth. Trans. Linn. Soc. 30: 621. 1875.

Five to 15 meters high, the light brown bark with small darker brown lenticels, the crown spreading, the branchlets, petioles and peduncles densely reddish pubescent with short subappressed trichomes, these extending to the leaf-rachi and calyces; glands rather small or inconspicuous, the rachis wings prominent; leaflets typically sessile, in the Peruvian specimens stoutly short-petiolulate, 5 pairs, ovate-oblong-elliptic, acutely acuminate, rounded at base, the middle ones 1.5 dm. long, a third as broad, sparsely hirsutulous but lustrous and rugulose above by the impressed nerves and veins, these conspicuous and sparsely hirsutulous beneath, otherwise glabrous; peduncles nearly lacking, the axillary spikes with 3–4 sessile flowers, the small ovate bracts caducous before anthesis; calyx 1.5 cm. long, the densely silky-villous corolla about 5 cm. long, twice exceeded by the stamens, their tube well-exserted.—*I. quadrangularis* Ducke, Archiv. Jard. Bot. Rio Jan. 3: 60. 1922, and *I. calantha* Ducke, l.c. 4: 18. 1925, both Brazilian and similar, have well-peduncled spikes, the former with nearly emarginate leaf-rachis. F.M. Neg. 1108.

Loreto: Timbuchi, on the Río Nanay, *Williams 958*. Brazil. "Cotochupa."

Inga Poeppigiana Benth. in Hook. Lond. Journ. Bot. 4: 602. 1845; 620. *I. ciliata* Poepp. & Endl. Nov. Gen. & Sp. 3: 78. 1845, not Presl.

Slender flowering branchlets, petioles and leaf nerves beneath sparsely ciliate-hirsute; stipules subrotund-ovate, about 5 mm. long; leaflets 3 pairs, oblong-elliptic, acuminate, obliquely rounded at base, 12 cm. long, 5 cm. broad or smaller, membranous, lustrous above and glabrous except for the sparsely hispid slender nerves; rachis broadly winged, the small circular glands deeply cupulate; spikes sessile, only 1–2.5 cm. long, the crowded membranous ciliate bracts 5 mm. long, persisting; calyx finely striate, glabrous except for the shortly ciliolate teeth, 12–15 mm. long; corolla slender, to 3 cm. long, glabrous unless for a few cilia near the tip, the stamen tube included.—F.M. Neg. 1109.

Loreto: Yurimaguas, *Poeppig 2436*, type.

Inga pruriens Poepp. & Endl. Nov. Gen. & Sp. 3: 78. 1845; 618. *I. Weberbaueri* Harms, Bot. Jahrb. 42: 90. 1908(?).

Small tree, the branchlets soon terete and the petioles and leaf nerves beneath sparsely rusty-hirsute; leaflets 2–3 pairs, broadly elliptic or slightly obovate, somewhat narrowed at the obtuse or rounded base, shortly acuminate, as much as 3 dm. long, about a third as broad, glabrous above, often with at least 1 small gland on the midnerve near the base (the winged rachis with similar glands), rigid-chartaceous, the lateral nerves many and subparallel, more or less impressed above, prominent with the veins beneath; spikes axillary, laxly flowered, sessile or very shortly peduncled, 4–7 cm. long, the ovate acute hirsute bracts persisting, 3–4 mm. long; calyx and corolla hirsute, the former rather sparsely, 15 mm. long, striate, the latter 4–4.5 cm. long, the stamen tube long exserted.—The corolla pubescence is brown, the flower within and the filaments white (Weberbauer, from whose collection the description is in part taken). It has not been possible to determine if a gland is present on the leaflet nerve of the type of Harms' species but the types of both species agree so well in all other respects that this character alone is not significant; the gland is lacking on some leaflets of *I. pruriens*. F.M. Negs. 1175 (*Weberbauer*); 32061.

Huánuco: Prov. Huamalíes, near Monzón, 700 meters, *Weberbauer 3695* (type, *I. Weberbaueri*); 285. Tocache, *Poeppig 2015*, type.

Inga pulchriflora Ducke, Archiv. Inst. Biol. Veg. Rio Jan. 2: 37. 1935.

Small tree, all of the younger parts including the large dense terminal panicles densely reddish-hispid-villous; bract-like stipule at the

base of the inflorescence large, concave, abundantly pilose without; leaf-rachis emarginate, glabrate, the glands sessile or lacking; leaflets 2 pairs, shortly petiolulate, the upper 1.5 dm. long or longer, 8 cm. broad or broader (lowest much smaller), obovate, obtuse or nearly rounded at base, broadly obtuse and often apiculate at apex, coriaceous, more or less bullate-rugose above by the impressed nerves and veins and in age glabrate, lustrous, densely reddish-hirsute on the very prominent nerves beneath; peduncles 2–4 cm. long; bracts 2–4 mm. long, equaling the densely hirsute pedicels; calyx 10–12 mm. long, ashy-pubescent, the white sericeous corolla a third longer, its stamen tube included; pods flat, bi-ridged by the somewhat thickened margins, 15 cm. long, 2 cm. broad, rounded at both ends, closely and shortly brown-tomentose-villous.—Attains 16 meters (Krukoff).

Río Acre: Seringal Iracema, inundated woods, *Ducke*, type. Mouth of the Río Macauhán, *Krukoff 5243*. Brazil.

Inga punctata Willd. Sp. Pl. 4: 1016. 1806; 613.

Small essentially glabrous tree or the young parts obscurely appressed puberulent, the leaflets typically slightly punctate scabrous above, finely appressed strigillose beneath; rachis emarginate, the rather prominent glands depressed; leaflets ordinarily 2 pairs, oblong-elliptic, rounded or acutish at base, shortly and acutely acuminate, the terminal to 15 cm. long, nearly half as broad, the lower pair much smaller, somewhat lustrous above, prominently nerved and reticulate-veined beneath; peduncles 2–4 cm. long, mostly panicled at the branched tips, the ovoid spikes 1–2 cm. long; bracts minute, more or less promptly caducous; calyx appressed strigillose, typically barely 3 mm. long, the silky-villous corolla twice as long, the stamen tube shortly if at all exserted; pods subsessile, 1 dm. long or longer, 2–2.5 cm. broad, plane, the margins little elevated, the seeds separated by transverse impressions.—Variable or not understood. *Killip & Smith 29406* seems to belong here but not being typical it may be designated var. **elongata** Macbr., var. nov., foliis oblongis longe acuminatis; corollis ad 12 mm. longis. The leaf-rachis is obscurely margined, apparently nearly var. *chagrensis* Pittier, Journ. Dept. Agric. Porto Rico 13, no. 4: 135. 1929, or var. *panamensis* Benth., 613, the flowers still somewhat longer, the leaflets narrower; *Killip & Smith 22732*, however, seems from description to be Pittier's variety. *I. strigillosa* Spruce, 612, is according to Harms the same but Bentham maintained the Spruce form apparently on the basis of its more abundant puberulence and corollas 8 mm. long. *I.*

dumosa Benth. l.c. seems to be a glabrous form, the corolla 10 mm. long; in the longer corolla at least these approach my var. *elongata*. Specimens referred to this species at Dahlem include *Weberbauer 3427*, *Tessmann 3443*, the last from Loreto; they have calyces as much as 4 mm. long. *I. tenuirama* Harms, Repert. Sp. Nov. 13: 527. 1915, of Ecuador, allied by the author to *I. aggregata* et rels., would apparently be sought here; it has 3 pairs of leaflets, glabrous or nearly glabrous calyces 4 mm. long. F.M. Neg. 1112.

Amazonas: Near Santa Rosa, (*Raimondi*).—San Martín: Santa Cruz, (*Raimondi*); Pongo de Cainarachi, *Klug 2693*. San Roque, *Williams 7394*.—Huánuco: Chinchao, (*Raimondi*).—Ayacucho: Aina, *Killip & Smith 22732* (var.).—Loreto: Caballo-Cocha, *Williams 2446* (det. Standl.). Yurimaguas, *Williams 5233* (det. Standl., *I. Ruiziana*); (*Raimondi*). Río Itaya, *Killip & Smith 29406* (type, var. *elongata*); *Williams 3512*. Mouth of Río Apaga, *Tessmann 3875* (var.).—Río Acre: Río Macauhán, *Krukoff 5744; Ule 9430* (det. Harms). Colombia to Venezuela and Central America. "Shimbillo," "rufindi."

Inga quaternata Poepp. & Endl. Nov. Gen. & Sp. 3: 79. 1845; 603.

Small tree or sometimes 12 meters or so high, the younger parts including the leaflet veins beneath and the flowers puberulent or the latter sericeous-tomentose, the corollas always densely so; leaf-rachis emarginate, the glands small or obscure; leaflets 3–4 pairs, oblong-elliptic, obliquely rounded at base, shortly acuminate, somewhat lustrous, finely reticulate-veined, chartaceous, often 15 cm. long, about 5 cm. broad or broader; peduncles 2.5 to several cm. long, solitary but usually some also in an ample terminal panicle; pedicels 2–12 mm. long, rarely obsolete, numerous, the narrowly obconic striate calyx 3–5 mm. long, the pubescence sometimes sparse, the corolla 8–12 mm. long, little enlarged apically; stamen tube barely exserted; pods little dilated at margins, rusty velvety (Ducke). —Flowers white, pulp surrounding seeds edible (Mexia). Cf. *I. Pavoniana*. *Tessmann 5307* from Loreto has pedicels only 3–3.5 mm. long, calyx 7 mm. long, corolla nearly twice as long; det. Harms as "affine"; in *Klug 2068* the pedicels are only 1 mm. long, the peduncles axillary; in *Mexia 6325* the calyx is only 3 mm. long, the corolla 12 mm. long; these and other aberrant collections seem to indicate only a reasonable range of variation. Cf. *I. nobilis*. F.M. Neg. 1113 (not type collection).

Huánuco: Pampayacu, *Kanehira 41*.—Loreto: Yurimaguas, *Mexia 6076* (det. Standl., *I. corymbifera* Benth.?); *Killip & Smith 28307; 28154; Williams 3944* (all det. Harms). Pongo de Manseriche, *Mexia 6325* (det. Standl.). Florida, *Klug 2068*. Near Iquitos, *Klug 486* (det. Harms). La Victoria, *Williams 3185* (det. Harms). Río Mazán, *José Schunke 335*.—Río Acre: Mouth of Río Macauhán, *Krukoff 5254*. Brazil; Colombia. "Shimbillo."

Inga Ruiziana G. Don, Gen. Syst. 2: 391. 1832; 614. *I. foliosa* Benth. in Hook. Lond. Journ. Bot. 4: 597. 1845.

Medium-sized often widely branched tree, the young branchlets densely white lenticellate and more or less rusty-puberulent, the leaves crowded, ample, with 4–6 (8) pairs of oblong-elliptic shortly acuminate, glabrous or nearly glabrous leaflets; rachis sometimes obscurely margined, the glands sessile, depressed; leaflets mostly 1.5–2 dm. long, 5–7 cm. broad, subcoriaceous, lustrous, the nerves prominent both sides, the veins only beneath, the former usually sparsely and minutely puberulent; peduncles 1–2 (4) cm. long, fascicled in the upper axils or densely panicled, the ovoid spikes scarcely more than 1 cm. long; calyx and corolla more or less puberulent (lightly strigillose in type) the former 3–4 mm. long, the latter 6–8 mm. long; stamen tube included or slightly exserted; pods puberulent or glabrate, to 1.5 dm. long, 2–2.5 (4) cm. broad.—Sometimes 15 meters high, with white fragrant flowers; the pulp surrounding the seed is eaten by boys and monkeys (Mexia). F.M. Neg. 1116.

San Martín: Lamas, *Williams 6466*(?). Near Chazuta, (*Raimondi*).—Huánuco: Tocache, *Poeppig*. Shapajilla, 630 meters, *Woytkowski 10*. Without locality, *Ruiz & Pavón*, type; *Mathews 1923*.—Loreto: Yurimaguas, *Poeppig 2443* (type, *I. foliosa*); *Mexia 6073*. Río Santiago, *Tessmann 3725* (det. Harms); *Mexia 6334; 6176*. Pebas, *Williams 1753*. Balsapuerto, *Klug 3094; 3151*. Caballo-Cocha, *Williams 2288*. Contamaná, *Killip & Smith 26873* (distr. as *I. nobilis*). Brazil to Central America. "Ucsha-quiro," "pacay," "shimbillo."

Inga setifera DC. Prodr. 2: 432. 1825; 615.

Small tree, the branchlets, leaflets beneath and peduncles more or less rusty-puberulent or shortly pilose-setulose; leaflets usually 2 pairs, broadly elliptic, shortly acuminate, the larger 15 cm. long, 6–7 cm. broad, becoming coriaceous and lustrous above, reticulate-

veined and sometimes glabrate beneath; rachis wings short but usually rather conspicuous as also the cupulate glands, the rachis terminating in a fragile or deciduous bristle; peduncles several cm. long, solitary or geminate, the spikes about 3 cm. long; calyx narrowly tubular, striate, sparsely sometimes minutely setulose or glabrate, 6–7 mm. long; corolla appressed silky-hirsute, 12–15 mm. long, the stamen tube included; pods flat, about 10–15 cm. long, 2 cm. broad or broader, the margins somewhat raised.—*I. splendens* Willd., 615, rather similar and to which Harms referred *Klug 1172* as "affine," has obtuse glabrous leaflets, the narrowly if at all winged rachis without bristle; the Klug specimen has a bristle, the leaflets acuminate; the same authority referred *Williams 939* and *1143* as "affine" *I. pilosiuscula* Desv. Journ. Bot. 1: 71. 1814; 616, that is, **I. pilosula** (Rich.) Macbr., comb. nov. (*Mimosa pilosula* Rich. Act. Soc. Hist. Nat. Paris 113. 1792), which probably is the earliest name for these closely allied forms but, at least as to type, has coriaceous lustrous essentially glabrous leaflets like those of *I. nitida* Willd. and is scarcely different apparently unless the calyx and corolla are both somewhat shorter, and the leaf-rachis without terminal bristle. The flowers of *I. setifera* typically are a beautiful golden yellow (Ducke). Here would be sought the Ecuadorian *I. balaensis* Pittier, Contr. U. S. Nat. Herb. 18: 201. 1916, calyces 10–12 mm. long, corollas twice as long, leaflets very broad, the lower pair much smaller than the upper, these 11–17 cm. long, 7–10.5 cm. wide. Illustrated, Bot. Mag. *pl. 5075* (as *I. macrophylla*). F.M. Negs. 6982; 21855.

Loreto: Mishuyacu, flowers bright yellow, *Klug 892* (det. Harms); flowers white, *Klug 1172*. Río Nanay, *Williams 939; 1143*. To Trinidad. "Shimbillo-rujinti."

Inga setosa G. Don, Gen. Syst. 2: 388. 1832; 624.

Densely rather long hirsute setose at least on the branchlets, broadly winged leaf-rachis beneath and peduncles, the last axillary, 5 cm. long or longer, bearing a subglobose spike about 4 cm. thick; stipules broad; rachis glands small, stipitate; leaflets (3) 5–6 pairs, oblong-elliptic, shortly acuminate, moderately long pilose both sides, conspicuously venose beneath, the larger 15 cm. long, less than half as broad; calyx striate, pubescent, 10 mm. long, the villous corolla about 15 mm. long, the stamen tube included.—Type at Oxford, without data. Scrap at Dahlem from Bernhardi Herb., from which the negative was made, determined as this species, has leaflets 8 cm. long, 2 cm. wide and smaller, bracts subulate-linear, persisting, calyx

7 mm. long, the narrow teeth lightly hispid as the corolla, this 12 mm. long. F.M. Neg. 1119.

Peru(?): *Pavón*, type.

Inga stenoptera Benth. in Hook. Journ. Bot. 2: 143. 1840; 616.

Similar to *I. setifera* but the leaflets ordinarily only 5 cm. broad or narrower, subcoriaceous, lustrous, finally glabrate and the rachis wing narrow or imperfect, sometimes obscure; spikes ovoid-globose or becoming 1.5 cm. long.—Pods apparently unknown but probably this is a form of *I. pilosula* (cf. note under *I. setifera*) with more narrowly oblong, more shortly acuminate leaflets. Calyx teeth in type from northern Brazil are ovate; in the Spruce specimen they are a little narrower. F.M. Neg. 1123.

San Martín: Tarapoto, *Spruce 4126* (det. Benth.). Brazil.

Inga stipulacea G. Don, Gen. Syst. 2: 391. 1832; 621. *I. setigera* Poepp. & Endl. Nov. Gen. & Sp. 3: 80. 1845. *I. rufiseta* Benth. Mart. Fl. Bras. 15, pt. 2: 489. 1876. *I. chaetophora* Harms, Notizbl. Bot. Gart. Berlin 6: 299. 1915.

Sparsely branched tree, the branchlets, petioles and large rigid persisting stipules, these even to 2.5 cm. long, densely hispid with spreading stiff reddish trichomes; leaf-rachis emarginate, the glands sessile or stoutly stipitate; leaflets 3–5 pairs, oblong, shortly acuminate, slightly narrower at the rounded base, the larger 3 dm. long, 7 cm. broad, mostly smaller, rigid-membranous or subcoriaceous, shortly and sparsely pubescent above, paler and setulose on the veins beneath; spikes axillary, becoming oblong, the peduncles little exceeding the bract-like stipules, the oblong or linear obtuse bracts persisting after anthesis; calyx 16–18 mm. long, tubular, striate, glabrous; corolla about 2 cm. long with a few setae near the tip, the stamen tube long-exserted.—The corolla in the Harms specimen is white and somewhat more pubescent; with it were two pods, 1–3.5 dm. long, 2–2.5 cm. broad, weakly bi-keeled on the margins, more or less brown-hispid. F.M. Negs. 1143 (*I. chaetophora*); 32063 (*I. setigera*).

Loreto: Yurimaguas, *Poeppig 2391* (type, *I. setigera*). Without locality, *Ruiz & Pavón*, type.—Río Acre: *Ule 941* (type, *I. chaetophora*). Brazil.

Inga striata Benth. in Hook. Lond. Journ. Bot. 4: 608. 1845; 619. *I. ochroclada* Harms, Notizbl. Bot. Gart. Berlin 6: 302. 1915.

Tree, the branchlets, petioles and peduncles densely villous with short spreading yellowish-brown trichomes, the leaflets beneath and especially on the midnerve above more or less similarly pubescent; leaf-rachis conspicuously winged with 3–5 pairs of oblong-elliptic leaflets, rounded at base, acuminate, usually 10–15 cm. long, 3–5 (8) cm. broad, lustrous but somewhat hirsute above, finely reticulate-veined, the lateral nerves prominent beneath, the texture finally subcoriaceous; peduncles 3–10 cm. long or longer, the rachis about 3 cm. long with linear bracts 6 mm. long or longer, caducous at least shortly after anthesis; calyces sessile, tubular, hirsutulous or becoming glabrate (or glabrous) striate, (8) 10–15 (17) mm. long; corolla densely sericeous-villous, (1.8) 2.5 (3) cm. long; stamen tube included; pods rusty-villous, the margins strongly dilated and raised, about 3 dm. long, 1.5 cm. broad.—*I. Eggersii* Harms, Bot. Jahrb. 42: 88. 1908, Ecuadorian, has persisting bracts 7–11 mm. long, calyx sparsely puberulent or subglabrous, 7–8 mm. long, corolla about 2.5 cm. long. The larger floral measurements refer to the type of *I. ochroclada* but they do not seem to be significant; however, the pod of his plant is unknown. F.M. Negs. 1124; 1159 (*I. ochroclada*).

Junín: Colonia Perené, *Killip & Smith 24995*.—San Martín: Shapaja, *Belshaw 3175* (?, young).—Río Acre: Seringal San Francisco, *Ule 9419*. South America.

Inga tarapotensis Spruce ex Benth. Trans. Linn. Soc. 30: 609. 1875.

Glabrous except for a sparse minute probably evanescent puberulence on the obscurely winged leaf-rachi and the slender axillary or lateral and clustered peduncles, these sometimes 2.5 cm. long; glands small, scutellate; leaflets 2–3 pairs, obliquely oblong-elliptic, rounded or obtuse at apex, coriaceous, lustrous above, paler and obscurely venose beneath, 5–7.5 cm. long, about 2 cm. broad; heads subglobose, the rachis scarcely 4 mm. long; pedicels fully 1 mm. long, the calyx nearly twice as long; corolla 5–6 mm. long, the stamen tube finally well-exserted; pods compressed, 18 cm. long, nearly 2.5 cm. broad, rounded at both ends, apiculate at apex, glabrous, the margins nerviform.—Type 6 meters, the white flowers with the fragrance of *Narthecium*, the bog asphodel of gardens (Spruce). *Spruce 4565*, in fruit, from which the description of the pod is drawn, could belong to *I. cynometrifolia; I. paraensis* Ducke, Archiv. Jard. Bot. Rio Jan. 4: 12. 1925, seems to be very similar. *I. gracilifolia* Ducke, l.c. 3: 52. 1922, has 5 pairs of leaflets, 2–4 cm. long, 6–10

mm. wide; it is a slender tree sometimes 30 meters high that may extend into eastern Peru and is closely allied indeed to *I. virgultosa* (Vahl) Desv. of Cayenne. F.M. Negs. 1125; 1079 (*Spruce 4565*).

San Martín: Tarapoto, *Spruce 4221*, type; *4565; Ule 6359;6360.*

Inga tenuistipula Ducke, Archiv. Jard. Bot. Rio Jan. 3: 51. 1922. *I. Guentheri* Harms, Notizbl. Bot. Gart. Berlin 10: 178. 1927.

Like *I. Tessmannii* but the leaflets 1–2 (3) pairs, and, especially, the flowers subsessile with calyx scarcely 2 mm. long, the corolla 7 to nearly 10 mm. long; peduncles 1–2 dm. long.—In Harms' specimen the corolla is nearly 10 mm. long, the leaflets 2 pairs. *I. Sodiroi* Harms, Repert. Sp. Nov. 13: 527. 1915, Ecuadorian, is another species of the same affinity but the leaflets are half as wide as long and strongly nerved, the nerves impressed above, peduncles 4–6 cm. long, corolla 7–8 mm. long. F.M. Negs. 1151 (*I. Guentheri*); 28135.

Loreto: Soledad, *Tessmann 5233* (type, *I. Guentheri*). Florida, *Klug 2210* (det. Standl.). Brazil. "Shimbillo," "gerogui-mitiri-ey."

Inga Tessmannii Harms, Notizbl. Bot. Gart. Berlin 9: 966. 1926.

Small tree or the branchlets semiscandent, the leaves with 4 pairs of oblong-elliptic leaflets borne on petiolules 1–1.5 cm. long, the peduncles often fascicled at enlarged nodes on the older wood, elongate, sometimes even 10 cm. long; leaflets acute at base, shortly acuminate, chartaceous, 1–2 dm. long, 5–7 cm. broad or larger; flowers typically sessile in subglobose heads, the calyx sparsely puberulent, lightly striate, about 6 mm. long, little exceeded by the corolla, this sparsely appressed-puberulent, 8–10 mm. long.—Glabrous except for the obscurely puberulent dark green calyx and bright green corolla, the filaments yellowish-white. Tree about 5 meters high or liana (Tessmann) in flood-free woods. As remarked by the author the resemblance to *I. cinnamomea* seems to be great. A perplexing specimen referred by Harms to *I. lallensis* ex descr. could be described as another species but it seems to me to differ only in pedicellate glabrous shorter flowers and may become var. **Harmsii** Macbr., var. nov., pedicellis 1–1.5 mm. longis; floribus glaberrimis, vix 8 mm. longis (*Klug 1195*, type). Here might be sought *I. cecropietorum* Ducke, Archiv. Jard. Bot. Rio Jan. 3: 52. 1922, of Amazonian Brazil with winged leaf-rachi, mostly panicled heads, calyx 7–8 mm. long, corolla 10–11 mm., densely hirsute at tip. F.M. Neg. 1173.

Loreto: Mouth of the Santiago, *Tessmann 4655*, type; also *4616* (fide Harms). Mishuyacu, *Klug 1195*, var.

Inga tomentosa Benth. Trans. Linn. Soc. 30: 609. 1875.

With the inflorescence and small flowers of *I. marginata* but well marked by the tomentum of short crisped trichomes that extends even to the flowers but finally disappears from the upper surfaces of the leaves, these with the rachis winged above and with 3 pairs of oblong obtusely acuminate leaflets, 7–10 cm. long, rounded at base; branchlets angled; spikes axillary to 15 cm. long, shortly peduncled, the bracts small, caducous; calyx scarcely 2 mm. long, the corolla twice as long, the stamen tube included.—The locality if Peruvian is probably in the Department of Puno. *I. Bangii* Harms of Bolivia lacks the winged leaf-rachis.

Peru(?): Near El Garania, (*Lechler 2323*, type). Bolivia.

Inga umbratica Poepp. & Endl. Nov. Gen. & Sp. 3: 77. 1845; 601.

Tree allied to *I. myriantha* but the branchlets angled and the leaflets subequal, membranous, sparsely pubescent beneath, the larger to 2 dm. long, 7.5 cm. broad, obtusely acute both ends; umbels subsessile or the peduncle very short, the pedicels 6–8 mm. long; flowers white, fragrant, puberulent-villous, the trichomes loose, the calyx scarcely exceeding 2 mm., the corolla hardly 5 mm. long; stamen tube long-exserted; pods about 3.5 cm. broad, obtuse at each end, straight, glabrous.—The minute but loose villosity on pedicels and calyces seems to be distinctive. These parts in *I. bullatorugosa* Ducke, Archiv. Jard. Bot. Rio Jan. 3: 47. 1922, are tomentulose, stamen tube little exserted, leaflets strongly bullate. *I. cecropietorum* Ducke, l.c. 52, of the upper Amazon has subsessile flowers twice as long. F.M. Neg. 1127.

Loreto: Yurimaguas, *Poeppig*, type.

Inga velutina Willd. Sp. Pl. 4: 1014. 1806; 621. *Mimosa velutina* (Willd.) Poir. in Lam. Encycl. Suppl. 1: 42. 1810. *I. expansa* Rusby, Bull. N. Y. Bot. Gard. 8: 90. 1912.

Softly rusty-pubescent or shortly villous even to the calyces, markedly so on the branchlets, peduncles and leaflets beneath; rachis wings conspicuous as also the circular glands; leaflets usually 3 pairs, sessile or stoutly short petiolulate, rounded or subcordate at base, obtuse or shortly acuminate, ample, the larger 3 dm. long

and half as broad, subcoriaceous, the short pubescence above subscabrous; spikes solitary or fasciculate in the upper axils, the peduncles to 6 cm. long; bracts caducous before anthesis; calyx tubular, 16–20 mm. long, with nearly subulate teeth sometimes 3 mm. long; corolla about 3 cm. long, silky-villous, little ampliated toward apex, the stamen tube often long-exserted; pods plane, fleshy, densely reddish-hispid, straight or curved, about 2 dm. long, 3 cm. broad, the margins only slightly enlarged.—*I. expansa* seems to be a variety, the calyx broader with broader teeth. F.M.—Neg. 1128.

Peru (probably). Bolivia; Brazil.

Inga vismiaefolia Poepp. & Endl. Nov. Gen. & Sp. 3: 79. 1845; 627.

Sparsely branched tree, the terete branchlets and peduncles more or less densely rusty-villous-tomentose, the latter terminally racemose, ordinarily about 3 cm. long; leaf-rachis emarginate, the glands depressed; petiolules stout, the 3 pairs of ample leaflets broadly elliptic or slightly obovate, obliquely rounded at base, apiculately acuminate, often 2 dm. long or longer, nearly half as broad, coriaceous, lustrous, glabrate and rather obscurely veined above, shortly scarcely densely villous and prominently reticulate-veined beneath; spikes subglobose, the ovate bracts persisting after anthesis; calyx appressed silky-strigose, 8–10 mm. long, the flaring densely villous corolla 15–17 mm. long, its stamen tube included. —F.M. Negs. 1132; 1133.

Loreto: Yurimaguas, *Poeppig 2285*, type; *Klug 2831*. Soledad, *Tessmann 5307* (det. Harms, *I. quaternata*, affine).

Inga yacoana Macbr., spec. nov.

Arbor ad 10 m. alta; ramulis petiolisque (cum rachi conspicue alato) ferrugineo-hirsuto-puberulis, demum glabrescentibus; foliolis 3-jugis fere sessilibus ovato-ellipticis vel paullo obovatis ad basin plus minusve suboblique angustatis apice subabrupte breviter obtuseque acuminatis 8–11 cm. longis, 4.5–6 cm. latis, chartaceis supra vix nitidulis praeter costam puberulam glabris subtus pallidioribus obscure papillosis glabris (costa nervisque haud vel sparsissime pubescentibus); spicis ut videtur solitariis sessilibus brevibus plerumque ad nodos defoliatos ad 1.5 cm. longis; bracteis persistentibus fere linearibus 1.5 mm. longis; floribus sessilibus; corolla 4 mm. longa, glabra calycem quadruplo excedente, staminum tubo haud exserto.

—Distributed as *I. fagifolia* (L.) Willd. which apparently as interpreted is the same or nearly the same as *I. marginata* but which as to actual character of type seems to be obscure, and is scarcely Peruvian.

Río Acre: On varzea land (river shore) near mouth of Río Macauhán (tributary Río Yaco), *Krukoff 5661*, type.

2. ALBIZZIA Durazzini

Like *Pithecolobium* but the broadly linear pods strongly compressed, indehiscent or bivalved, but the valves never elastic or contorted, sometimes dividing transversely. Seeds exalbuminous, ovate or orbiculate, compressed, the funicle filiform.—Besides the following, *A. Lebbeck* (L.) Benth., closely resembling *P. Saman* except for the flattened pods, may be found in cultivation.

Albizzia distachya (Vent.) Macbr. Contr. Gray Herb. 59: 3. 1919; 559. *Mimosa distachya* Vent. Descr. Cels, *pl. 20.* 1800. *Acacia lophantha* Willd. Sp. Pl. 4: 1070. 1806. *M. elegans* Andr. Bot. Rep. 9: *pl. 563.* 1810. *A. lophantha* (Willd.) Benth. in Hook. Lond. Journ. Bot. 3: 86. 1844.

Tree with velvety puberulent branchlets, leaf-rachi and peduncles, the petioles with a gland toward the base; pinnae 8–10 pairs with 20–40 pairs of oblong obtusish leaflets 6–8 mm. long, about 2 mm. broad, usually sparsely appressed-pilose at least beneath, the midnerve excentric; spikes axillary, shortly peduncled, 3–10 cm. long, more than 3 cm. thick including the stamens, the crowded flowers distinctly pedicelled, silky-pilose, the calyx 2 mm. the corolla 5 mm. long; stamen tube scarcely longer than the calyx; pods 6–10 cm. long, 12–18 mm. broad, glabrous.—Hochreutiner, Candollea 2: 373. 1925, retains the specific name of Willdenow because of the existence of the homonym *M. distachya* Cav. 1794. With due respect for the opinion of my friend I cannot concur because the name is not in conflict as regards *Albizzia;* this interpretation was in accord with the International Rules and any retroactive action which the rules may impose would only result in instability of the nomenclature. According to Vargas the bark is used as soap. Illustrated, Bot. Mag. *pl. 2108.*

Cuzco: Semicultivated near Urubamba, *Vargas 11065.* Yucay, *Soukup 564.*—Arequipa: Near the City of Arequipa, (*Soukup*). Australia. "Killay."

3. PITHECOLOBIUM Mart.

Reference: Benth. Trans. Linn. Soc. 30: 570–598. 1875.

Smooth or occasionally armed with stipular spines (in Peru only *P. dulce*), the leaves bipinnate (pinnae sometimes only 1 pair and reduced to 1–3 leaflets) with few to many leaflets, the 5 (6) -merous flowers in globose heads or cylindrical spikes on solitary or fascicled peduncles, these axillary or terminal and then sometimes racemose or paniculate. Calyx campanulate or tubular, shortly dentate. Corolla tubular or infundibuliform, the tube rather longer than the lobes. Stamens few to many, exserted, the tube long or short. Ovary sessile or stiped, many-ovuled. Pods fleshy-cylindrical to coriaceous, more or less compressed, usually falcate and contorted or even spiraled in varying degrees, rarely nearly straight, bivalved, the valves sometimes twisted after dehiscence or infrequently indehiscent, or very tardily so, or disarticulating, the seeds ovate or orbicular with filiform funicle or this variously expanded into a fleshy aril.—Merrill, Journ. Wash. Acad. Sci. 6: 42. 1916, argued for adopting the spelling "Pithecellobium"; the name has also been written "Pithecollobium." It is derived according to Merrill from pithecos ellobion (monkey's earring), but usage fortunately has validated the simplest spelling, at the same time the most euphonious form.

Genus, as noted by Bentham, not separable from *Albizzia* Durazz. except by the pod and, at least in the case of *P. Saman* and *P. polycephalum*, only the fleshy character of the fruit distinguishes the group; nevertheless by reason of convenience and tradition and from the fact that *Albizzia* is in any case characteristically if not entirely Old World, and *Pithecolobium* New, the group names will probably always be maintained. In Candollea 6: 4. 1934, I presented my reasons for not accepting, at least in floristic work, the division of the genus as proposed by Pittier, Britton & Killip, and Kleinhoonte; it is noteworthy that the last in Pulle's Flora of the Suriname does not always agree with the former authors as to which section treated as a "genus" certain species belong. Herewith is a key under one group name, which, entirely artificial though it may be, at least brings together plants that more resemble each other than any others in this work (unless for one or two connecting species); therefore they constitute a *genus* and that, realistically, is the only kind of classification that is practical. To give these group names on characters that obviously vary in degree of development and which are rarely available or at least in herbaria discernible, is purely

academic folderol resulting in keys that not even a trained taxonomist can follow through. Finally it is satisfactory to observe that the two best informed and unquestionably most brilliant students of the Legumes, Bentham and Ducke (the one in the herbarium, the other in the field), have not imitated or followed the obviously possible segregation of these species into many genera. The only constructive contribution to their classification that could be made would be their inclusion in *Albizzia* as already noted.

Pinnae 1 pair (most rarely 2 pairs on some leaves; cf. also *P. acreanum*).

Flowers in globose heads on usually slender peduncles, these either solitary, racemose or paniculate (cf. *P. triflorum* under *P. Weberbaueri*); pods finally contorted, seeds arillate; leaflets 1–2 pairs.

Leaflets small, obtuse; stipules spinescent.

Leaflets 1 pair; flowers ashy puberulent..... *P. dulce.*

Leaflets 2 pairs; flowers lightly puberulent..... *P. excelsum.*

Leaflets ample, acute; stipules not spinescent..... *P. laetum.*

Flowers in elongate, short or subglobose spikes, these always lateral, the peduncles short or obsolete; leaflets 1–several pairs (rarely solitary).

Flowers capitate or glomerulate or in short spikes only 1–3 cm. long.

Calyx minute, scarcely more than 1 mm. long, usually shorter.

Flowers umbellulate on peduncles 3–8 mm. long or leaf-nerves equally distinct.

Stamen tube little exserted; leaflets usually more than 2. *P. cauliflorum.*

Stamen tube often long-exserted; leaflets solitary. *P. unifoliolatum.*

Flowers in short spikes or glomerulately congested or leaf-nerves unequally developed.

Flowers glomerulately congested..... *P. latifolium.*

Flowers obviously in short spikes..... *P. longifolium.*

Calyx nearly 2 mm. long or longer.

Calyx 2–2.5 mm. long.

Leaflets 1–2 pairs; corolla 4 mm. long, twice as long as calyx..... *P. divaricatum.*

Leaflets 3–4 pairs; corolla 6 mm. long, typically about 3 times longer than calyx.....*P. inaequale.*

Calyx 3–4 mm. long, the corolla 6–8 mm. long, both puberulent.....*P. juruanum.*

Flowers in elongate spikes, all or mostly 8–16 cm. long.

Stamen tube included in the corolla, this 8 mm. long. *P. coccineum.*

Stamen tube well exserted.

Corolla 10–12 mm. long.....*P. macrophyllum.*

Corolla about 4 mm. long.....*P. oriundum.*

Pinnae mostly more than 2 pairs (cf. *P. cauliflorum; P. corymbosum* and relatives, variable in number of pairs).

Heads axillary or crowded at the tips of the branches, the peduncles usually long.

Leaflets (at least most pinnae) 12 or more pairs, acute or mucronulate.

Leaflets 2–3 mm. wide.

Plants unarmed; pods contracted between the seeds. *P. sophorocarpum.*

Plants armed; pods impressed between the seeds. *P. Mathewsii.*

Leaflets several mm. wide.

Flowers 5 cm. long; peduncles short.....*P. Spruceanum.*

Flowers 1 cm. long; peduncles long.....*P. chazutense.*

Leaflets rarely as many as 12 pairs, always obliquely rounded or blunt.

Leaflets about 1 cm. wide.

Flowers subsessile; pods more or less circinate..*P. Jupunba.*

Flowers long-pedicelled; pods straight.....*P. corymbosum.*

Leaflets about 3 cm. wide or wider.

Flowers sessile or nearly; rachis glands small.....*P. Saman.*

Flowers pedicelled.....*P. acreanum.*

Heads racemose or racemose-paniculate from the axils or at the branchlet tips, the peduncles short.

Leaflets not acutely auricled or strongly oblique at base.

Leaflets 2–8 mm. long.

Leaflets minute, rarely 4 mm. long.....*P. niopoides.*

Leaflets 5–8 mm. long.....*P. polycephalum.*
Leaflets 12–20 mm. long.....*P. multiflorum.*
Leaflets acutely auricled or oblique at base; racemes or spikes short.
Racemes lax; leaflets subequal.....*P. basijugum.*
Racemes dense; leaflets unequal.....*P. umbriflorum.*

Pithecolobium acreanum Macbr., spec. nov.

Ut videtur *P. adenophorum* Ducke persimilis, differt pinnis 3–4 jugis, foliolis 3–5 jugis, pedicellis vix 5 mm. longis, corollis 3–3.5 mm. longis, staminibus circa 10 mm. longis.—Ducke, Archiv. Inst. Biol. Veg. Rio Jan. 4: 5. 1938, in proposing his Amazonian species distinguished it from *P. microcalyx* Spruce, 582, of the Rio Negro, by the extraordinarily large urceolate leaf-glands, larger terminal leaflets (4.5–8 cm. long, 3–5 cm. wide), rigid-coriaceous and prominently reticulate-veined, pedicels 7–8 mm. long, calyx 2 mm. long, stamens more than 15 mm. long; as he fails to mention the number of pinnae presumably they are the same, namely, 1–2 pairs and the leaflets 2–3 pairs.—The Klug collection of *P. acreanum* has rachis glands 2–5 mm. broad; these on the type are at most about 2 mm. wide; the inflorescence of the latter is ample, corymbose, and it is possible that the two collections are not the same, the former possibly representing Ducke's species; in any case both share the distinction from *P. microcalyx* of urceolate (instead of conical) glands, and, at least as regards *P. acreanum*, of more numerous pinnae and leaflets. A tree 12–25 meters high with white and garnet flowers (Klug); leaves of flowering branchlets 3 dm. long; leaflets obliquely suborbicular, the lateral mostly 4 cm. long, 3 cm. wide, glabrous, subcoriaceous, lustrous, reticulate-veiny both sides, paler beneath; peduncles simple (Klug specimen) or the inflorescence corymbose even to 1.5 dm. broad, rusty-puberulent.

Río Acre: On terra firma, mouth of Río Macauhán, *Krukoff 5631*, type.—Loreto: Balsapuerto, *Klug 3079*(?).

Pithecolobium basijugum Ducke, Archiv. Jard. Bot. Rio Jan. 5: 122. 1930.

Small tree, the glabrate younger branchlets white lenticellate, the white flowers in shortly peduncled few-flowered heads borne in lax racemes usually 3–5 cm. long from the lower branches; peduncles and leaf-rachi puberulent; pinnae 7–9 pairs, with 18 (21)

leaflets, these acutely auriculate at base on the lower edge, acute or shortly acuminate, to 1 cm. long, 4 mm. broad, firm-membranous, partially 3-nerved, the stronger middle nerve little excentric, the veins obscure; flowers sessile, the calyx 1–1.5 mm. long, nearly as broad, subglabrous, the corolla 8–12 mm. long, slightly dilated at the minutely puberulent apex, the stamen tube not exserted; pods to 2 dm. long, 1.5 cm. broad, plane, finally somewhat contorted, glabrous, laxly reticulate without, reddish within.—The Tessmann specimen was referred by Harms to *P. claviflorum* Spruce, 596, scarcely different but among other slight variations its flowers are red, its stamen tube long-exserted. According to Ducke, his species was seen near Iquitos.

Loreto: Iquitos, *Tessmann 5345* (det. Harms, *P. claviflorum*). Brazil.

Pithecolobium cauliflorum (Willd.) Mart. ex Benth. in Mart. Fl. Bras. 15, pt. 2: 450. 1876; 595. *Inga cauliflora* Willd. Sp. Pl. 4: 1021. 1806. *Zygia cauliflora* (Willd.) Killip, Trop. Woods 63: 6. 1940.

Glabrous (typically), or leaf-rachis puberulent, this 1–7 cm. long; stipules deciduous or obsolete; pinnae 2, each usually with 3–5 (often one much smaller at base) obliquely oblong or ovate-oblong opposite leaflets, the larger usually 7–10 cm. long, 3–4 cm. broad, acuminate, subcoriaceous, the unequally distinct lateral nerves strongly arcuate ascending, the veins moderately reticulate both sides; peduncles 3–8 mm. long, several fascicled in the axils of older branchlets; calyx 1 mm. long, glabrous or slightly ciliate puberulent, the corolla 5–7 mm. long, the stamen tube more or less exserted; pods said to be coriaceous, straight or curved, 1.5 dm. long or longer, 1.5 cm. wide.—Small tree or tall shrub, the flowers according to Ducke roseate. *Klug 1054* and *1418* have lightly puberulent flowers, larger leaflets and perhaps are distinct but the group is poorly understood. F.M. Neg. 1187.

Loreto: Mishuyacu, *Klug 2533* (det. Standl., *P. glomeratum*); *1054; 1418*. Brazil to the Guianas.

Pithecolobium chazutense Standl. Field Mus. Bot. 22: 145. 1940.

Thick branchlets, leaf-rachi and slender peduncles rather densely rusty-puberulent; glands between the 5 pairs of pinnae (the upper of these 13–14 cm. long) thickly crateriform; leaflets about 15 pairs, sessile, rather oblong, somewhat broader at base, obliquely rounded

both ends, minutely apiculate at tip, mostly 2–2.5 cm. long, 7–10 mm. broad, membranous, glabrous above except for the obscurely puberulent little excentric midnerve, scarcely paler beneath, the slender remote nerves not prominent; flowers densely capitate, ochroleucous, nearly glabrous throughout, the slender solitary or few peduncles 6–8 cm. long; calyx broadly campanulate, scarcely longer than 1.5 mm. high, the minute unequal obtuse teeth glandular; corolla 9 mm. long, the slender tube dilated at throat to 1.5 mm. broad, the lobes 1 mm. long; stamen tube included.—Type from forest tree 15 meters high.

San Martín: Chazuta, *Klug 4011*, type.

Pithecolobium coccineum [R. & P.] Benth. Trans. Linn. Soc. 30: 594. 1875. *Inga coccinea* [R. & P.] G. Don, Gen. Syst. 2: 390. 1832.

Glabrous except for the puberulent pods; pinnae 1 pair with 3–5 pairs of obliquely oblong acuminate leaflets, sometimes an additional small leaflet near the base of the narrowly grooved rachis, the leaflets subcoriaceous, reticulate-veined especially beneath, mostly 10–12 cm. long, 4–5 cm. broad; spikes including the short peduncle to 1.5 dm. long; calyx 2 mm. long, the striate cylindrical corollas 8 mm. long, the stamen tube included; pods shortly stiped, about 2 dm. long, 2 cm. broad.—In my collection the spikes of bright red-purple flowers were pendent from old leafless branchlets; a large spreading forest tree, the branches straggling. The first common name refers to the red flowers, similar to the rebozos or mantillas used by the Indian women (Ruiz & Pavón). F.M. Neg. 29425.

Junín: Pichis Trail, *Killip & Smith 25814*.—Huánuco: Muña, *Ruiz & Pavón*, type; *4023*.—Loreto: Yurimaguas, *Killip & Smith 28003*. "Huaita rebozo," "monte pacae."

Pithecolobium corymbosum (Rich.) Benth. in Hook. Lond. Journ. Bot. 3: 221. 1844; 587. *Mimosa corymbosa* Rich. in Act. Soc. Hist. Nat. Paris 1: 113. 1792. *Samanea corymbosa* (Rich.) Pitt. Bol. Cient. y Tecn. Mus. Com. Venez. no. 7: 55. 1925; Bol. Min. Relac. Ext. 90. 1927. *Arthrosamanea corymbosa* (Rich.) Kleinh. in Pulle, Fl. Surinam 2, pt. 2: 327. 1940.

Becoming a slender tree about 15 meters high, the younger parts more or less rusty or ashy tomentulose or the pubescence sometimes persisting on leaf-rachi and leaflets beneath, these 8–12 pairs, obliquely subrhombic or obovate-oblong, 12–18 (25) mm. long, 5–10

mm. wide, very lustrous above, distributed in 4–10 pinnae 5–20 cm. long; glands scutellate; peduncles many, terminal in umbels or corymbose umbels to 7 cm. long, the filiform pedicels 4–8 mm. long; calyces rubescent, campanulate, to 2.5 mm. long, the infundibuliform often puberulent corolla about twice as long, the tube of the 12–15 stamens included; pods straight or arcuate, coriaceous, glabrous, 5–10 cm. long, 8–10 mm. wide, finally disarticulating into 1-seeded segments.—Section *Samanea*. The Brazilian *P. marginatum* Spruce including *P. panurense* Spruce has only 1 pair of pinnae, the leaflets in 3–6 pairs, (1) 2.5–5 cm. long. Here might be sought **P. guachapele** (HBK.) Macbr., comb. nov. (*Acacia guachapele* HBK. Nov. Gen. & Sp. 6: 281. 1824; *Samanea samaningua* Pitt. Bol. Cient. y Tecn. Mus. Com. Venez. no. 1: 54. 1925, fide Britton & Killip; *Pseudosamanea guachapele* (HBK.) Harms, Notizbl. Bot. Gart. Berlin 11: 54. 1930), found as near as southern Ecuador. Its leaflets are soft and a little pilose especially beneath, its pods thinner, long-beaked, 2–5 cm. broad. F.M. Neg. 28259.

Loreto: Iquitos, *Tessmann 3678* (det. Harms). Brazil; Guianas.

Pithecolobium divaricatum [Bong.] Benth. in Hook. Lond. Journ. Bot. 3: 213. 1844; 595.

Glabrous unless for a minute puberulence on the branchlets and petioles; pinnae 1 pair with 2–3 pairs of oblong-lanceolate leaflets, the 2 terminal ones petiolulate, usually 10–18 cm. long, 2.5–5 cm. broad, obliquely contracted at base, subcoriaceous, slenderly reticulate-veined; peduncles 6–18 mm. long, fasciculate at the nodes or sometimes racemose on a short peduncle-like branchlet; flowers few, sessile, the tubular calyx nearly 2 mm. long, the white corolla 4 mm. long, the stamens reddish at apex, 16–18 mm. long, their tube exserted; pods arcuate, to 3 dm. long, 14–20 mm. broad, the thicker margins often sinuate between the seeds, the coriaceous valves often more or less contorted.—Tree to 7 meters (Spruce); flowers, according to Ducke, roseate. F.M. Neg. 1189.

Río Acre: (fide Ducke). Brazil.

Pithecolobium dulce (Roxb.) Benth. in Hook. Lond. Journ. Bot. 3: 199. 1844; 572. *Mimosa dulcis* Roxb. Pl. Corom. 1: 67. *pl. 99*. 1795.

Often strictly glabrous densely leafy branchlets armed by the short spinescent stipules and terminating in a narrow ashy-tomentulose panicle, this sometimes with 1 or 2 (or several) usually divari-

cate branches near the base, the white flowers in small subsessile or shortly stalked heads; pinnae 1 (rarely 2) pairs, the oval-oblong leaflets rounded at apex, mostly 2.5–3 cm. long, 1–1.5 cm. wide; corolla white, 2.5–3 mm. long; pods lightly compressed but fleshy, becoming circinate (often even 2–3 spiraled) or more often merely falcate, 1 dm. long or somewhat longer, 1–1.5 cm. wide, tardily dehiscing, red inside.—The subcylindrical fleshy pods are edible.—Illustrated, Degener, Fl. Hawaii. 1: *pl. 26.*

Piura: Negritos, *Haught F2.* Cape Pariñas, *Haught 119.* Venezuela to Mexico.

Pithecolobium excelsum (Kunth) Mart. ex Benth. Trans. Linn. Soc. 30: 573. 1875. *Inga excelsa* Kunth, Mimoseae 57. *pl. 18.* 1820.

Similar to *P. dulce* but typically softly puberulent especially on the leaves beneath; corolla 6–8 mm. long, more or less puberulent.—Bentham included here *P. candidum* (HBK.) Benth. from adjacent Ecuador, apparently the same but glabrous. F.M. Neg. 1192.

Cajamarca: Jaén de Brácamoros, *Bonpland,* type. Río Shumba, 700 meters, *Weberbauer 6174.*—Tumbez: Hacienda La Choza, rainy-green formation, 200 meters, *Weberbauer 7723.*—Without locality, *Raimondi.* Ecuador. "Kiriguinche."

Pithecolobium inaequale (H. & B.) Benth. in Trans. Linn. Soc. 30: 596. 1875. *Inga inaequalis* H. & B. ex Willd. Sp. Pl. 2: 1019. 1806.

Glabrous or evanescently pilose-puberulent; stipules small, subpersisting at the base of the peduncles; pinnae 1 pair, with 4–7 obliquely oblong-elliptic or oblong-lanceolate acuminate leaflets, the larger of these commonly 12–14 cm. long, about 5 cm. wide, chartaceous, rather conspicuously reticulate-veined both sides, the nerves strongly arcuate ascending; heads few-flowered, fascicled at the nodes of the older branchlets; peduncles 4–8 mm. long, calyx tubular, 2.5 mm. long; corolla to 6 mm. long, striate, ampliate above the teeth, obscurely puberulent; stamens red, the tube exserted; pods coriaceous, strongly arcuate or circinate, 16–18 mm. broad.—*P. amplum* Spruce ex Benth. l.c. is puberulent including the calyx and corolla, the former 2 mm. long. F.M. Neg. 1200.

Loreto: Florida, 4 meter tree, flowers red and white, *Klug 2060.* Mishuyacu, *Klug 1263.* Brazil.

Pithecolobium Jupunba (Willd.) Urb. Symb. Ant. 2: 257. 1900; 583. *Acacia Jupunba* Willd. Sp. Pl. 4: 1067. 1806. *Mimosa trapezifolia* Vahl, Eclog. 3: 36. 1807. *P. trapezifolia* (Vahl) Benth. in Hook. Journ. Bot. 2: 142. 1840. *Jupunba trapezifolia* (Vahl) Mold. Bull. Torrey Club 59: 155. 1932. *Abarema Jupunba* (Willd.) Britton & Killip, Ann. N. Y. Acad. Sci. 35: 126. 1936.

Tree, the branchlets and generally fascicled peduncles minutely rusty tomentulose, the stipules minute or obsolete, the leaves with 2–4 (6) pairs of pinnae, the leaflets 4–8 pairs, obliquely rhombic-ovate, usually about 4 cm. long, half as broad, or somewhat larger, often smaller, coriaceous, glabrous and lustrous above, puberulent beneath; peduncles axillary, sometimes rounded toward the tip of the branchlets, 2.5–5 cm. long or longer, the puberulent flowers sessile, or nearly, in globose heads, the calyx 2 mm. long, the corolla 2–3 times longer, the staminal tube included; pods circinate, the valves finally contorting, 8–10 mm. broad, reddish within; seeds with a horseshoe-shaped blue-green mark opposite the funicle (Kleinhoonte).—*P. campestre* Spruce, 436, has ovate acuminate leaflets broadly rounded at base, pods green and veiny both sides. *P. daulense* Spruce of southern Ecuador is glabrous including the flowers and pods, the former 3 mm. long, the latter 12 mm. broad.

San Martín: Near Moyobamba, 1,100 meters, *Klug 3357* (det. Killip).—Junín: Chanchamayo Valley, *Schunke 310*. To Colombia and the West Indies.

Pithecolobium juruanum Harms, Verh. Bot. Ver. Brandenb. 48: 162. 1906.

Glabrous shrub 5 to 15 meters high; leaflets 3 pairs, with a solitary lower one, oblong-lanceolate, narrowed at base, often acuminate, 10–12 cm. long, 4–6.5 cm. broad, chartaceous, glabrous; peduncles 5–8 mm. long, puberulent as also the calyx and corolla, the former 3.6–4 mm. long, the latter twice as long.—The Peruvian specimens have coriaceous leaflets and at least on the leaves seen only 1 to 2 pairs; the calyx is scarcely 3 mm. long; the determinations therefore are open to question. F.M. Neg. 1202.

San Martín: Pongo de Cainarachi, 6 meter tree, flowers rose, *Klug 2667* (det. Killip).—Loreto: Mishuyacu, *Klug 572; 216*. San Antonio, *Killip & Smith 29382*. Brazil.

Pithecolobium laetum (Poepp. & Endl.) Benth. in Hook. Lond. Journ. Bot. 3: 203. 1844; 434. *Inga laeta* Poepp. & Endl. Nov.

Gen. & Sp. 3: 80. 1845. *P. polycarpum* Poepp. & Endl. l.c. 81. *Klugiodendron laetum* (Poepp. & Endl.) Britton & Killip, Ann. N. Y. Acad. Sci. 35: 126. 1936.

Tree or small shrub, shortly rusty-villous on the branchlets, petioles, peduncles and leaf nerves or glabrate in age especially the leaves; stipules subulate, 4 mm. long; petioles 2.5–5 cm. long, the glands oblong, the rachis very short, rarely 2.5 cm. long, the pinnae usually 1 pair as also the oval or oblong-elliptic, acuminate reticulate-veined leaflets, these to 14 cm. long, about a third as wide; peduncles ordinarily geminate, axillary, to 5 cm. long; calyx sessile, turbinate, 2 mm. long, rusty-pubescent; corolla 6–7 mm. long, the lobes glabrate or pubescent apically, the stamens 2.5 cm. long, their tube included; pods to 1.5 dm. long, 1.5 cm. wide, the valves finally somewhat contorted; seeds white, with a fleshy aril (Poepp. & Endl.).—The related *P. leucophyllum* Spruce, 433, of the upper Amazon has very obtuse lustrous leaflets, the corolla only twice as long as the calyx; *P. microcalyx* Spruce, 434, has 2–3 pairs of broad leaflets, the glabrous corolla four times longer than the pedicellate calyx. To 12 meters, the timber esteemed for canoe paddles, from which the native name "paddle-wood" (Williams). F.M. Neg. 1204.

San Martín: Pongo de Cainarachi, *Klug 2639*.—Loreto: Mishuyacu, *Klug 658; 794; 955; 1039; 1534* (all det. Harms). Soledad, *Killip & Smith 29726; 29746*. Iquitos, *Killip & Smith 27485*. Río Paranapura, *Klug 3933*. Río Nanay, *Williams 359* (det. Harms). Yurimaguas, *Poeppig 2245; 2367; Tessmann 5509; Williams 3867; 4190; 4444; 4734* (all det. Harms). To the Guianas. "Shimbillo," "remo-caspi."

Pithecolobium latifolium (L.) Benth. in Hook. Lond. Journ. Bot. 3: 214. 1844; 595. *Mimosa latifolia* L. Syst. Nat. ed. 10: 1310. 1759. *Zygia latifolia* (L.) Fawc. & Rendle, Fl. Jam. 4, pt. 2: 150. 1920.

Typically glabrous, or the leaf-rachis somewhat puberulent; leaflets 1 or 2 (3) pairs, usually with an extra one below, the lower alternate, usually broadly elliptic, and with 3 nerves more prominent, shortly and bluntly acuminate, highly variable in size, 4 cm. long, 1.5 cm. broad, or more usually 7–12 cm. long, 4–5 cm. broad; stipules sometimes persistent, 3–4 mm. long; flower-heads subsessile, densely clustered; calyx rarely more than 1 mm. long; corolla striate, dilated sometimes toward the ciliate teeth, 5–7 mm. long, the red stamens more than twice as long, their tube exserted; pods slightly curved,

1–3 dm. long, 1.5–2.5 cm. broad.—Originally from the West Indies but apparently the Peruvian specimens are not distinguishable. *P. glomeratum* (DC.) Benth. seems questionably distinct; it has, ordinarily, 3 lanceolate leaflets. This and allied species characteristically grow along streams.

Loreto: Iquitos, *Mexia 6515* (det. Standl.); *Killip & Smith 27410; Tessmann 3640; 5118* (det. Harms, *P. glomeratum* or affine). Mouth of Río Santiago, *Tessmann 4090* (det. Harms, *P. cauliflorum* or affine).—Río Acre: Río Macauhán, *Krukoff 5328; 5798.* To Central America and the West Indies.

Pithecolobium longifolium (H. & B.) Standl. Field Mus. Bot. 4: 212. 1929. *Inga longifolia* H. & B. ex Willd. Sp. Pl. 4: 1010. 1806. *Zygia longifolia* (H. & B.) Britt. & Rose, N. Amer. Fl. 23: 40. 1928.

Glabrous or sparsely evanescently puberulent on the leaf-rachi; pinnae 2, with 1–2 pairs of oblong-lanceolate membranous or in age chartaceous leaflets, these acuminate at both ends, reticulate-venose, the larger about 12 cm. long, 4 cm. broad, the additional leaflet near base of rachis if present very much smaller; stipules minute or small, acuminate; spikes about 2 cm. long, shortly peduncled or subsessile, 2 or several on the older branches below the leaves; calyx campanulate, less than 1 mm. long, glabrous or the minute teeth ciliate; corolla 3–4 mm. long, white, the ovate lobes acute; stamens 1.5 cm. long, the tube exserted; pods to 10 cm. long, torulose, with many black orbicular-lenticular seeds.—*P. brevispicatum* Ducke, Archiv. Jard. Bot. Rio Jan. 3: 68. 1922, seems similar, especially to the northern forms that have been included, but is puberulent on the leaves beneath.

Cajamarca: Near Cavico at the River Chamaya, *Bonpland*, type.—San Martín: Juanjuí, tree, 10 meters, flowers white and yellow, *Klug 3915* (det. Standl., *P. amplum*).—Junín: Puerto Yessup, *Killip & Smith 26360* (det. Killip). Ecuador? Colombia? "Chichimbina."

Pithecolobium macrophyllum Spruce ex Benth. Trans. Linn. Soc. 30: 593. 1860. *P. martinianum* Standl. Field Mus. Bot. 22: 145. 1940.

Glabrous; rachis of the 2–5 foliate leaves 10–25 cm. long, with a small depressed gland between each pair of subcoriaceous, obliquely oblong-elliptic acuminate leaflets, these reticulate-veined especially

beneath, pale green, the larger terminal, 1.5 dm. long or longer, 6–8 cm. broad, the odd basal one much reduced; spikes 1 or 2, 1–1.5 dm. long, including the 3–4 cm. long peduncle; calyx 1–3 mm. long, the narrowly tubular corolla to 12 mm. long, apparently glabrous but under a lens, as the calyx, obscurely and sparsely puberulent at the subobtusely lobed tip; stamen tube more or less exserted.—A tree 3 meters high with lilac-rose flowers (Klug); robust climbing shrub, spikes red (Spruce). From scrap of the type, including flowers which show considerable variation in length of calyx and stamen tube, it seems impossible to maintain the Klug specimen as a distinct species. F.M. Neg. 32030.

San Martín: Tarapoto, *Spruce 4112*, type. Chazuta, *Klug 4149* (type, *P. martinianum*).

Pithecolobium Mathewsii Benth. in Hook. Lond. Journ. Bot. 3: 222. 1844; 597.

Tree with stocky branchlets, these puberulent, conspicuously spinose; pinnae 5–8 pairs; leaflets 15–20 pairs, obliquely oblong, scarcely 3-nerved, glabrous above, puberulent beneath, about 5 mm. long; peduncles 1 cm. long; calyx truncate, scarcely a third as long as the ampliate corolla, this about 6 mm. long.—Timber highly esteemed; common on the sandy plain of Tarapoto (Williams). *P. mangense* (Jacq.) Macbr., widely distributed, often has somewhat smaller leaflets, corolla barely 4 mm. long, pod 10–12 mm. broad; however, the species seem to be very similar. F.M. Neg. 1210.

San Martín: Moyobamba, (*Mathews*, type; Weberbauer, 290). Tarapoto, *Spruce 4185*. Juanjuí, 4 meter tree, flowers cream, *Williams 6463; 5532* (det. Harms); *Klug 4173*. "Algarrobo."

Pithecolobium multiflorum (HBK.) Benth. in Hook. Lond. Journ. Bot. 3: 220. 1844; 445. *Acacia multiflora* HBK. Nov. Gen. & Sp. 6: 277. 1823. *Samanea multiflora* (HBK.) Pitt. Trab. Mus. Com. Venez. 2: 91. 1927. *Senegalia multiflora* (HBK.) Killip, Trop. Woods 63: 6. 1940. *Arthrosamanea multiflora* (HBK.) Kleinh. in Pulle, Fl. Surinam 2, pt. 2: 326. 1940. *P. Weberbaueri* Harms, Repert. Sp. Nov. 16: 350. 1919.

Branchlets glabrous, their crowded leaves slightly overtopping the many-flowered narrow inflorescences, the small flower-heads racemose on peduncles only 5–10 mm. long, petiole gland obscure; leaf-rachis 6–10 cm. long; pinnae 1–3 (4) pairs, 5–10 cm. long, with 8–11 pairs of obliquely oblong leaflets rounded at both ends, or

barely acutish, sparsely puberulent-pilose beneath, or glabrate, mostly 1–2.5 cm. long, 5–13 mm. broad; flowers glabrous or nearly, 2–2.5 mm. long; stamens to 20; pods to 12 cm. long, 18–20 mm. broad, about 6 mm. thick, indehiscent.—The species could be left in *Acacia;* the type was described as glabrous, the leaflets acute but actually under the binocular they are seen to be obscurely puberulent and they are acute merely by an obscure mucro. Since the type of *P. Weberbaueri* and *P. multiflorum* are from the same region it does not seem probable that these discrepancies are more than variations to be expected in one species. However, I doubt that the material that has been referred to *P. multiflorum* from outside Peru (except Ecuador) is the same; Ducke, from material other than Peruvian, has described the pod as suggesting that of *Wallaceodendron* Koord., the valves of the pericarp remaining entire while the mesocarp separates and becomes divided into indehiscent segments; this is certainly not the case with the plant interpreted here as the species of HBK. *P. coripatense* Rusby, Bull. N. Y. Bot. Gard. 4: 349. 1907, found as near as La Paz, Bolivia, has 6 pairs of pinnae, puberulent leaflets, pods apparently as described by Ducke. *P. triflorum* Benth. from southern Ecuador seems to be the same unless for the fewer (1–2) pinnae. F.M. Neg. 1221.

Piura: Negritos, *Haught 274.* Cabo Blanco, *Haught F112; 180.*—Cajamarca: San Felipe, near Jaén, *Bonpland,* type. Between Jaén and Bellavista, 600 meters, *Weberbauer 6207* (type, *P. Weberbaueri*).—Ancash: Uchos, 1,700 meters, *Weberbauer 7021* ("differs from type in larger leaflets," Harms).—Loreto: Iquitos, *Killip & Smith 29999*(?). "Cospano."

Pithecolobium niopoides Spruce ex Benth. in Mart. Fl. Bras. 15, pt. 2: 447. 1876.

Similar to *P. polycephalum* but the growing young parts ashy-puberulent, the leaflets linear-foliate, puberulent or finally glabrate, only 3–4 mm. long, to 30 pairs on 6–8 pairs of pinnae; racemes in the upper axils 5–10 cm. long, the slender peduncles 4–8 mm. long, the heads without the stamens only 4 mm. thick; flowers sessile, the corolla 2 mm. long, about 3 times longer than the calyx; stamens 6 mm. long, the tube subexserted; pods unknown.—The wood absorbs water like a sponge and remains wet (Ducke). F.M. Neg. 1213.

Loreto: Mouth of Santiago, *Tessmann 4035* (det. Harms). Bolivia; Brazil.

Pithecolobium oriundum Macbr., spec. nov.

Arbor; ramulis cortice sordide incano obtectis flexuosis subteretibus; petiolis cum rachidibus foliorum pulverulentis; pinnis unijugis; foliolis 1–2 jugis (addito uno inferiore) oblongo-ellipticis basi inaequaliter acutis apice acute acuminatis, 8–12 cm. longis, 3–5 cm. latis, submembranaceis, glabris vix nitidulis utrinque reticulato-venosis; spicis ad 1.5 dm. longis; floribus sessilibus, minutissime parceque puberulis, calycibus vix 1 mm. longis corollis vix 5 mm. longis; filamentorum tubus satis exsertus.—The Tessmann specimen was in Herb. Dahlem as *P. amplum* Spruce; it has somewhat longer calyx and corolla 7 mm. long and possibly is referable to *P. macrophyllum* or some related species; only a scrap is available to me at this time.

Loreto: Yurimaguas to Balsapuerto, *Killip & Smith 28273*, type. Mouth of Santiago, *Tessmann 4151*(?).

Pithecolobium polycephalum Benth. in Hook. Lond. Journ. Bot. 3: 219. 1844; 446. *Samanea polycephala* (Kunth) Pitt. Bol. Cient. y Tecn. Mus. Com. Venez. no. 1: 55. 1925. *Albizzia polycephala* Killip, Trop. Woods 63: 6. 1940.

Branchlets, petioles and peduncles reddish tomentulose, the last slender, 12–25 mm. long, often fasciculate in racemes, sometimes paniculate in the upper axils and on the branchlet-ends; stipules small, subulate, caducous; petioles often 1 dm. long or longer, glandular, the middle gland oblong; pinnae 8–10 pairs, usually 5–7 (11) cm. long, the 12–15 (25) pairs of sessile falcate-oblong obtuse or acutish leaflets 6–8 mm. long, 3 (4) mm. wide, glabrous or glabrate above, minutely appressed puberulent beneath; bracts glanduliferous; heads without stamens (these 12 mm. long their tube included) 6 mm. in diameter; flowers puberulent, the calyx 1.5 mm. long, the corolla 3–4 mm. long (or longer?); pods straight or falcate, reddish-tomentulose, 7–12 cm. long, to nearly 2 cm. wide, the margins little enlarged, indehiscent.—This is indeed a species of *Albizzia* if *Pithecolobium* should be, as technically possible, submerged. Tree to 20 meters high.

San Martín: Tarapoto, *Spruce 4407*.—Río Acre: *Ule 9437* (distr. as *P. multiflorum*). Brazil to Guiana and Colombia.

Pithecolobium Saman (Jacq.) Benth. in Hook. Lond. Journ. Bot. 3: 216. 1844; 441. *Mimosa Saman* Jacq. Fragm. 15. *pl. 9.* 1800. *Enterolobium Saman* (Jacq.) Prain, Journ. Asiat. Soc. Bengal

66: 252. 1897. *Samanea Saman* (Jacq.) Merrill, Journ. Wash. Acad. Sci. 6: 47. 1916.

Branchlet tips, petioles and inflorescences including the flowers ashy or yellowish tomentulose-puberulent; stipules linear-lanceolate, caducous; basal petiolar gland urceolate; pinnae 2–4 pairs, the upper pinnae with 12–16 leaflets, progressively fewer below, the lowest with not more than 8, all approximate, obliquely obovate or subrhombic, obtuse, lustrous and glabrous or nearly on the reticulate-veined upper surfaces, puberulent-strigillose beneath, mostly 3–4 cm. long, about half as broad, exceptionally to twice as large; peduncles axillary, solitary or usually fascicled, 5–12 cm. long, the head-like umbel rounded with 10–12 flowers on pedicels 2–4 mm. long; calyx and corolla narrowly tubular, appressed silky-pilose, the former 6 mm. long, the latter nearly twice as long; stamens roseate, to 5 cm. long, the tube included; pods straight or somewhat curved, fleshy, indehiscent, 1–2 dm. long, rarely 2.5 cm. wide.—Var. *acutifolia* Benth. refers to specimens with ovate or obovate acutish less coriaceous and more glabrate leaves, the larger 5 cm. long or longer; calyx slightly larger than in typical form (Bentham).

The herbarium specimens resemble *Albizzia Lebbek* (which compare) with however membranous broader pods, usually less pubescent thinner duller leaflets; it is perhaps in cultivation in Peru. Planted in the tropics and known as "raintree."

San Martín: Juanjuí, *Klug 3761*. Tarapoto, *Williams 5495*.—Junín: Chanchamayo Valley, *Schunke 58*. La Merced, *5433*. Central and South America. "Huacamayo-chico."

Pithecolobium sophorocarpum Benth. in Benth. & Hook. f. Gen. Pl. 1: 598. 1865; 588. *P. angustifolium* Rusby, Mem. N. Y. Bot. Gard. 7: 253. 1927.

Slender tree 6–12 meters high well marked in fruit by the fleshy terete moniliform scarlet necklace-like pods, strongly contracted between the seeds into often 9–12 ovoid segments 1.5 cm. long, nearly 1 cm. broad; leaf-rachi and slender solitary or geminate peduncles more or less rusty-puberulent, the latter to 5 cm. long; pinnae 1–7 pairs (the gland between each pair small), usually with 12–25 obliquely oblong acute leaflets mostly 7–15 mm. long, 2–5 mm. broad, sometimes considerably larger or especially longer, glabrous or sometimes pubescent at base beneath; calyx scarcely 2 mm. long; corolla about 7 mm. long, the stamen tube included.—Highly

variable in size of leaflets, which prompted Rusby to propose var. *angustifolium*, Mem. Torrey Club 6: 28. 1896, but a series of specimens seems to show variation in Central America as in the Andes.

Huánuco: Common on forested slope, above Cayumba, *Mexia 8309*. Bolivia; Central America. "Siraricillo."

Pithecolobium Spruceanum Benth. in Mart. Fl. Bras. 15, pt. 2: 443. 1876; 590. *Macrosamanea Spruceana* (Benth.) Killip, Trop. Woods 63: 6. 1940.

Vigorous scandent shrub, glabrous except the minutely tomentulose growing parts and the inflorescence including the showy white flowers, the stamens of which attain 3.5 cm.; stipules obsolete; petioles to 3 dm. long, the larger glands scutellate; pinnae 6–9 pairs, 7–12 cm. long with mostly 12–18 pairs of sessile ovate-rhombic incurved acute lustrous subcoriaceous leaflets, 12–18 mm. long, 6–8 mm. wide, the terminal pair acuminate; peduncles stout, 12–18 mm. long, in the upper axils and crowded terminally, the flowers sessile, their corolla 5 cm. long, more than twice as long as the tubular calyx; stamens numerous, the tube long-exserted; pods unknown.—Supposedly related Brazilian species, these with pods (so far as known) thin to rigid-coriaceous, straight or falcate, to be expected include *P. simabaefolium* Spruce, 443, 1 pair of pinnae, 1–2 pairs of oblong or obovate obtuse leaflets, to 2.5 cm. long; **P. discolor** (Humb. & Bonpl.) Macbr., comb. nov. (*Inga discolor* Humb. & Bonpl. ex Willd. Sp. Pl. 4: 1023. 1805; *Inga adiantifolia* Kunth, Mimoseae 66. *pl. 21*. 1820; *P. adiantifolium* (Kunth) Benth. in Hook. Lond. Journ. Bot. 3: 218. 1844; *Macrosamanea discolor* (Humb. & Bonpl.) Britton & Rose, Ann. N. Y. Acad. Sci. 35: 131. 1936), well-marked by the narrow (6 mm.) leaflets, to 2.5 cm. long; *P. longiflorum* Benth., 444, and *P. lindseaefolium* Spruce, 443, both with many falcate-rhombic or oblong obtuse or obtusish leaflets, 1–2.5 cm. long, the former with 6–8, the latter with 3–4 pairs of pinnae. *P. Spruceanum* and relatives according to Ducke become lianas in inundated forests while in open places or along banks they are shrubs with long tortuous branches. The species may be a variety of *P. discolor*.

Loreto: Río Itaya, *Williams 3282*. Timbuchi, *Williams 879*. Mishuyacu, *Klug 2504*. Soledad, *Tessmann 5257* (det. Harms). Brazil. "Pashaquilla," "yaku-pashaca."

Pithecolobium umbriflorum Ducke, Archiv. Jard. Bot. Rio Jan. 5: 122. 1930.

Small tree, the white flowers in globosely clustered short spikes at the nodes of the defoliate branchlets; stipules small; pinnae 3–4 pairs, sometimes with a scutellate gland between them, the rachi more or less rusty-villous, in the Peruvian plant lightly so; leaflets 6–9 pairs, the terminal to 5 cm. long, about 2 cm. broad, the lower gradually smaller, subrhombic-falcate-oblong, strongly oblique at base, incurved-acute and shortly setaceo-acuminate at apex, rigidly chartaceous, scarcely conspicuously reticulate-venulose beneath; spikes 1–2 cm. long; calyces 2–2.5 mm. long, glabrous or nearly as the corolla, this 4–6 mm. long, the stamen tube shortly exserted.—Affine *P. basijugum;* the Peruvian collection seems to differ only in being less pubescent.

Loreto: Mishuyacu, *Klug 404.* Brazil.

Pithecolobium unifoliolatum Benth. in Hook. Lond. Journ. Bot. 3: 212. 1844; 595.

Glabrous tree sometimes 30 meters high; pinnae 1 pair, the leaflets solitary, oblong-elliptic, lanceolate, acuminate, 1.5 dm. long, 3.5–4.5 cm. broad, subcoriaceous, reticulate-veined, especially beneath, scarcely or not at all lustrous; heads subglobose on peduncles 3–8 mm. long, fascicled at the nodes, the white glabrous or nearly glabrous flowers sessile; calyx minute, scarcely 0.5 mm. long, the corolla 6–8 mm. long; stamen tube shortly or distinctly exserted.—In a specimen at Paris referred here by Bentham himself the stamen tube is long exserted. Illustrated, Mart. Fl. Bras. 15, pt. 2. *pl. 118.*

Loreto: Mishuyacu, *Klug 460; 1358.* Amazonian Brazil. "Ingarana."

4. ENTEROLOBIUM Mart.

Like *Pithecolobium,* section *Samanea,* except that the pod is broadly circinate or incurved-reniform, fleshy compressed, becoming hard, divided within between the seeds, indehiscent.—As remarked by Bentham there is no difference except in the pod and its maintenance must be on the ground of convenience because traditionally recognized. This is scarcely justified if *Pithecolobium* itself is retained in its broad traditional sense. Prain proposed to include here *P. Samanea* (Jacq.) Benth.

Enterolobium Schomburgkii Benth. in Mart. Fl. Bras. 15, pt. 2: 457. 1876. *Pithecolobium Schomburgkii* Benth. in Hook. Lond. Journ. Bot. 3: 219. 1844.

Branchlet tips, petals and peduncles rusty tomentose-puberulent, the petioles glandular, the peduncles axillary, mostly 2–3 together, scarcely 2.5 cm. long; pinnae 10–20 pairs to 5 cm. long, the leaflets 50–60 pairs, linear-falcate, rigid, convex and lustrous above, puberulent beneath, 2–4 mm. long; calyx turbinate-tubular, 2 mm. long, the infundibuliform corolla scarcely 4 mm. long; stamens rarely 20; pod forming 1–2 cycles, dull or scarcely lustrous, 2.5–5 cm. broad.—To over 30 meters high on terra firma. *E. timbouva* Mart. and *E. maximum* Ducke, Archiv. Jard. Bot. Rio Jan. 1: 13. 1915; l.c. 2: 62. 1922, have only 2–5 pairs of pinnae, the leaflets of the former 10–20 pairs, to 18 mm. long, those of the latter 6–10 pairs, 1.5–3.5 cm. long.

Río Acre: Mouth of Río Macauhán, *Krukoff 5569*. To the Guianas and Central America.

5. CEDRELINGA Ducke

Character of *Pithecolobium* but the peduncles of the flower-heads proceeding from nodes, these well developed especially after anthesis. Pods pendulous, elongate, stiped, consisting of as many as 6 thin compressed segments separated by somewhat contorted tissue, each medially at the one seed little thickened but reticulate, the sutures lineate. Seed large, plane, oval, soft.—Large tree with trunk of *Cedrela*, leaves nearly those of *Piptadenia Poeppigii*, bipinnate, the leaflets few, ample, the inflorescence and flowers recalling *Pithecolobium niopoides* (Ducke).

Cedrelinga catenaeformis Ducke, Archiv. Jard. Bot. Rio Jan. 3: 70. *pl. 6*. 1922. *Piptadenia catenaeformis* Ducke, l.c. 1: 17. *pls. 5, 6*. 1915.

Bark deeply longitudinally rugose; pinnae 1–2 pairs; leaflets petiolulate, 3 pairs, obliquely ovate, rounded at base, acuminate, 5–9 cm. long, 2.5–5 cm. wide, lustrous above, opaque beneath, glabrous and densely reticulate-veined both sides; central rachis of terminal and upper axillary inflorescence to 15 cm. long bearing from alternate nodes 1–several peduncled heads, these peduncles about 1 cm. long, the heads scarcely as thick; flowers sessile, the subglabrous calyx hardly 1 mm. long, with 5 triangular teeth; corolla greenish-yellowish, about 4 mm. long, more than twice exceeded

by the white stamens that are connate barely to the middle of the corolla; pod segments oblong-oval to 15 cm. long, 5 cm. wide at middle, the terminal one often rudimentary.—Each fruit segment resembles the pod of *Platymiscium*. One of the largest trees of the Amazonian region in height and size of trunk, one example noted being 49 meters tall, 1.85 meters in diameter at 1.5 meters above the ground; wood more spongy than that of *Cedrela* and emits, when worked (but is as yet little used) a disagreeable odor (Ducke). F.M. Neg. 1224.

Loreto: Yurimaguas (fide Ducke). Amazonian Brazil. "Cedrorana."

6. CALLIANDRA Benth.

Anneslea Salisb.

Reference: Benth. Trans. Linn. Soc. 30: 536–557. 1875.

Shrubs or trees, usually unarmed, the bipinnate leaves with few to many membranous or more often firm small or ample leaflets, the narrow flowers with long (mostly 2.5 cm. long or longer) stamens borne in heads on axillary peduncles or these solitary or subfasciculate in terminal racemes. Flowers 5 (6) -merous, polygamous, the corolla narrowly campanulate to long-tubular, the petals valvate, coalescent to the middle. Calyx campanulate, rarely deeply divided. Stamens 10–100, partly connate or free, anthers minute, glandular-hirsute, rarely glabrous. Ovary sessile, many-ovuled. Pods linear, straight or nearly, usually flat with thickened margins, coriaceous or somewhat fleshy, elastically dehiscing from apex to the often narrowed base.—The name *Calliandra* is conserved.

Pinnae 1–2 pairs and the larger leaflets at least about 2 cm. long.
- Leaflets 1–2 pairs.
  - Leaflets ample, the larger several cm. wide.
    - Peduncles laxly panicled..... *C. amazonica.*
    - Peduncles more or less fascicled at the nodes.
      - Peduncles usually 1.5 cm. long or longer or the leaflets obtusely acuminate.
        - Stamen tube included; pod 8–10 mm. wide. . *C. bombycina.*
        - Stamen tube long-exserted; pod 14–16 mm. wide. *C. carbonaria.*
      - Peduncles shorter than 1 cm.; leaflets acutely acuminate. *C. rotundifolia.*
  - Leaflets all or mostly narrower than 1 cm..... *C. angustifolia.*

Leaflets several pairs.
Leaflets glabrous or essentially.
Terminal leaflets little larger than others; staminal tube exserted.....*C. chotanoana.*
Terminal leaflets much larger than the others; staminal tube little exserted.....*C. decrescens.*
Leaflets softly villous.....*C. mollissima.*
Pinnae usually and at least mostly more than 2 pairs; leaflets in any case small and many.
Pinnae 1–2 pairs; leaflets 10–15 pairs, 2–3 mm. long....*C. expansa.*
Pinnae at least mostly more than 2 pairs.
Leaflets coriaceous and lustrous or else minute.
Leaflets 4–8 mm. long; flowers long-pilose.....*C. Cumingii.*
Leaflets 2–2.5 mm. long; flowers glabrous or minutely pilose.
Peduncles very short.....*C. prostrata.*
Peduncles elongate.....*C. tumbeziana.*
Leaflets membranous, soft, light or bright green, at least several mm. long.
Petioles glandular.....*C. filipes.*
Petioles eglandular.
Leaflets 8–12 (20) mm. long; stamens white.
C. portoricensis.
Leaflets 4–6 mm. long; stamens roseate.....*C. caracasana.*

Calliandra amazonica Benth. in Hook. Lond. Journ. Bot. 3: 94. 1844; 409. *Inga bauhiniaefolia* Poepp. & Endl. Nov. Gen. & Sp. 3: 80. *pl. 290.* 1845.

Glabrous or the leaflets under a lens granular-punctate, and sparsely hispidulous on the nerves; stipules ovate-lanceolate or narrower, to 12 mm. long; petioles 2.5–3 cm. long, eglandular, bearing at an angle 1 pair pinnae, the leaflets usually 2, falcately oblong-ovate, 10 cm. long, 4 cm. wide, to about twice as large, obtusely acuminate, strongly oblique basally, more or less lustrous, firm, the 2–3 nerves beneath prominent, the veins rather obscure; terminal panicles with elongate branches, the peduncles solitary or fasciculate at nodes, 12–30 cm. long; bracts oblong or ovate, half as long as the calyx, this 1.5 mm. long, more or less deeply 5-dentate, the turbinate-campanulate thin corolla about 3 times longer, greenish-white; stamens roseate, many, shorter or little longer than 2.5 cm., the

tube included; pods thinly coriaceous to 2 dm. long, 1 cm. wide, reticulate-veined, the margins greatly thickened.—*C. trinervia* Benth. Amazonian and similar, has the peduncles in axillary fascicles, the shortly dentate calyx many times shorter than the firm striate corolla, the stamen tube long-exserted. Tree to 9 meters; stamens crimson (Mexia). F.M. Neg. 1226.

San Martín: Tarapoto, *Spruce 4494; Williams 6548; Ule 6720.*—Huánuco: Tingo Maria, *Stork & Horton 9477.* Along Río Huallaga, *Mexia 8295* (det. Killip).—Junín: Chanchamayo Valley, *Schunke 295.*—Loreto: Yurimaguas, *Poeppig 2070,* type.—Río Acre: *Ule 9438.*

Calliandra angustifolia Spruce ex Benth. Trans. Linn. Soc. 30: 539. 1875.

Tall glabrous shrub or small tree with spreading branches and many short densely leafy flowering branchlets, the flower-heads shortly peduncled in the axils; pinnae 1 pair, and leaflets 1–2 pairs, oblong, rather strongly oblique, when 2 pairs very unequal in size, the lower often reduced to 1 leaflet and only a few mm. (to 10) long, the upper usually 2–2.5 (–3) cm. long, about 8 mm. wide, coriaceous, lustrous, 2-nerved; peduncles 4–8 mm. long; calyx 2 mm. long, corolla nearly 3 times as long, the greenish-white flowers with roseate stamens to 4 cm. long; pods finally ligneous, to 9 cm. long, 7 mm. broad, the margins strongly thickened, the valves scarcely venose.—*C. subnervosa* Benth. and *M. Sodiroi* Harms, Repert. Sp. Nov. 17: 86. 1921, both of Ecuador, are somewhat pubescent; the former has 2 pairs of leaflets, shortly pubescent branchlets, the latter slightly pubescent leaflets. Used for construction (Williams).

San Martín: Juanjuí, *Klug 3765.* Pongo de Cainarachi, *Klug 2679.* San Roque, *Williams 6930; 7719; 7720.*—Junín: River gravel bank, La Merced, *5577; Killip & Smith 23611.* Río Perené, *Killip & Smith 25122.* Puerto Yessup, *Killip & Smith 26347.*—Loreto: Pongo de Manseriche, *Mexia 6313.* Río Nanay, *Williams 412.* North of Santiago, *Tessmann 4097.* Brazil. "Bobinsana," "bubinianal."

Calliandra bombycina Spruce ex Benth. Trans. Linn. Soc. 30: 538. 1875.

Glabrous, 2–9 meters high, the leaves with 1 pair of spreading pinnae, the leaflets often 2 pairs, the lower of these about half as large as the upper, or frequently themselves very unequal or reduced to 1 leaflet; leaflets obliquely oblong or ovate, more or less, often

shortly and bluntly acuminate, 6–16 cm. long, 4–7 cm. wide, chartaceous, slightly lustrous, loosely reticulate-veined; peduncles solitary or fascicled, 1.5–2 cm. long, stipulately bracted at base, the stipules ovate, rigid, striate; calyx 3 mm. long; corolla firm, striate, to 12 mm. long, the stamens sometimes 5 cm. long, the tube included or scarcely exserted; pods coriaceous, 10 cm. long or longer, 8–10 mm. broad.—*C. boliviana* Britton, found as near as La Paz, is apparently the same; *C. glyphoxylon* Spruce, 539, of Ecuador, is recognizable by its pilose leaflets, much smaller flowers and minute or obsolete stipules. According to Spruce "the rich colored silky flower-heads are much used as ornaments for the hair." F.M. Neg. 32031.

San Martín: Tarapoto, *Spruce 4235*, type; *Williams 6821*. Juanjuí, *Klug 4354*.—Loreto: Río Itaya, *Williams 3303*. Mouth of Santiago, *Tessmann 4101* (var., det. Harms).

Calliandra caracasana (Jacq.) Benth. Trans. Linn. Soc. 30: 543. 1875. *Mimosa caracasana* Jacq. Icon. Rar. 3: 20. 1786–93.

Glabrous or very sparsely pubescent slender-stemmed shrub usually a meter or so high with delicate light green rather remote leaves composed of 3–6 pairs of pinnae, these about 3 cm. long, and with 10–25 pairs of crowded linear leaflets, 4–6 mm. long, scarcely 1 mm. broad, soft, paler beneath; stipules lanceolate-acuminate, striate, to 5 mm. long; peduncles slender, usually 4–5 cm. long, the flower-heads 5–8 mm. thick; calyx cleft, 2 mm. long; corolla 3 mm. long, the roseate stamens more than 3 times longer; pods 5–7.5 cm. long, 4–8 mm. broad, the margins moderately enlarged, the valves submembranous.—The deeply divided calyx is noteworthy.

Cuzco: Valle de Santa Ana, *Herrera 904* (det. Harms). Echarate, Prov. Convención, 900 meters, *Vargas 249; Stork & Horton 10455*. To Panama and Venezuela.

Calliandra carbonaria Benth. in Hook. Lond. Journ. Bot. 3: 95. 1844; 538.

Similar to *C. bombycina* but the leaflets apparently always 1 pair, sometimes with 1 additional, much smaller leaflet; corolla 8–9 mm. long, the stamen tube long-exserted; pods 14–16 mm. broad.—It seems probable that more collections may show that only one somewhat variable species is concerned. *C. trinervia* Benth. of Brazil is apparently intermediate in character, the calyx only 2 mm. long, the corolla 6 mm. long. F.M. Neg. 1233.

Loreto: Pongo de Manseriche, *Mexia 6336* (det. Standl., *C. amazonica*). Florida, *Klug 2349* (det. Standl., *C. bombycina*). Río Mazán, *José Schunke 258* (det. Standl.). Above Lima, (*Raimondi*). Ecuador and apparently to Central America.

Calliandra chotanoana Harms, Repert. Sp. Nov. 17: 442. 1921.

Branchlet tips, leaf-rachi and solitary geminate peduncles shortly pilose; leaflets 3–5 pairs, sessile, obliquely obovate, or broadly subrhombic-oblong, strongly oblique at the base especially the terminal, rounded or retuse at apex, 1–2.5 cm. long, 5–15 mm. broad, the lower often minute or deciduous, glabrous or subglabrous, subcoriaceous, 2–3-nerved; stipules lanceolate, acute, 3–4 mm. long; peduncles 1–2 cm. long; flowers glabrous or nearly; calyx 1–2 mm. long, the corolla 4.5 mm. long, the exserted stamens 3 cm. long or longer.—Apparently similar to *C. purpurea* (L.) Benth. and *C. tenuiflora* Benth., 547, but flowers as to type smaller. *C. aculeata* Spruce, of Ecuador, has leaflets 2.5–5 cm. long, the peduncles 5 cm. long; *C. haematocephala* Hassk., 548, origin unknown, is apparently similar but has obtusely acuminate, much larger leaflets. It seems probable that *C. purpurea* is variable. F.M. Neg. 1235.

Cajamarca: Valley of the Río Chotano, 1,000 meters, *Weberbauer 7123*, type.

Calliandra Cumingii H. & A. in Hook. Lond. Journ. Bot. 2: 140. 1840; 551. *Inga speciosa* Mart. & Gal. Bull. Acad. Brux. 10, pt. 2: 320. 1840–44.

Remotely leafy, the puberulent villous petioles proceeding from conspicuous, apparently clustered, coriaceous membranous-margined acute stipules about 5 mm. long; pinnae 2–6 pairs with 10–25 pairs of oblong, somewhat falcate, firm lustrous glabrous leaflets (the rachis puberulent), usually 4–6 mm. long, 2 mm. broad or on the older or lower leaves twice as large; peduncles slender, to 3 cm. long; flowers at least typically somewhat long-pilose, the calyx scarcely 1 mm. long, the corolla nearly 8 mm. long; pods subligneous.—The flowers of material referred here from Central America are essentially glabrous; Bentham remarked: "The specimens I have seen are none of them very satisfactory, but I believe they all belong to one species."

Amazonas: Chachapoyas, (*Mathews*, det. Benth.). Panama to Mexico.

Calliandra decrescens Killip & Macbr., spec. nov.

Arbor ad 6 m. alta; pinnis unijugis, foliolis 5–6 jugis oblique obovatis subrhombeisve obtusis vel obtuse acuminatis imprimis terminalibus usque 4 cm. longis, 2 cm. latis, a apice ad basin foliorum conspicue decrescentibus utrinque costa media excepta glabris tenuiter reticulato-venulosis nitidulis; pedunculis puberulis 1.5 cm. longis; calyce vix 2 mm. longo glabro, striato; corolla 6–7 mm. longa, haud striata, sparse strigosa; staminum tubo incluso vel vix exserto; legumine puberulo intra margines crassos coriaceo 12 cm. longo, ad 1 cm. lato.—Another close ally of *C. purpurea* (L.) Benth. and apparently nearest *C. tenuiflora* Benth. but that species has long-exserted stamen tube and smaller completely glabrous leaflets, even the terminal little different in size from the others. Flowers noted by collector as dark red and white.

Loreto: Mishuyacu, *Klug 152*, type; *791*.

Calliandra expansa [R. & P.] Benth. Trans. Linn. Soc. 30: 549. 1875. *Mimosa expansa* R. & P. in herb.

Low shrub forming clumps that are matted by the incurving of the branches, these sometimes minutely puberulent at the tips; leaves with 1 or rarely 2 pinnae, these only a cm. or so long and with 10–15 pairs of linear, slightly oblique obtuse or acutish leaflets 2–3 mm. long; peduncles obsolete, to 5 mm. long; calyx 1 mm. long, the corolla 4 mm. long, the stamens about twice as long; pods subligneous, glabrous, about 3.5 cm. long, 4–6 mm. broad.—The flowers of my collection were a very deep and bright yellow. *C. taxifolia* Benth., 546, and *C. magdalenae* Benth., 547, both found as near as Ecuador, usually have more leaflets that are about twice as long, the former with corolla 6 mm. long, the stamen tube included, the latter with corolla to 4 mm. long, the stamen tube exserted. F.M. Neg. 1229.

Ancash: Below Chavin, (Weberbauer, 174). Near Huaraz, 2,200 meters, *Weberbauer 3260*, flowers blood red; 173.—Huánuco: Below Ambo, dry gravelly slope, *2419*. San Rafael, *Sawada P122*. Near Huánuco, *Ruiz & Pavón*, type.

Calliandra filipes Benth. in Hook. Lond. Journ. Bot. 2: 139. 1840; 542.

In general like *C. caracasana* but at least most of the petioles with a small gland near the base and with minute glands between 1 or more of the 3–4 pinnae, the rachi somewhat puberulent; leaflets

10–16 pairs, oblong, 8–12 mm. long, 2–3 mm. broad, puberulent both sides; corolla 4 mm. long.—I fail to see the leaf glands on the Peruvian material and if the character is reliable, these specimens should be referred to *C. portoricensis.*

San Martín: Flowers cream-colored, Juanjuí, *Klug 4298* (det. Standl.). Chazuta, flowers white and yellow, *Klug 4014* (det. Standl.).—Loreto: Yurimaguas, *Ule 6725* (det. Harms). Brazil.

Calliandra mollissima (H. & B.) Benth. in Hook. Lond. Journ. Bot. 3: 97. 1840; 541. *Mimosa mollisima* Poir. in Lam. Encycl. Suppl. 1: 46. 1810. *Inga mollisima* H. & B. in Willd. Sp. Pl. 4: 1023. 1806.

Distinctive among Peruvian species by the extremely soft pilosity that extends to the peduncles, least pronounced on the upper leaf surfaces; pinnae 1 pair with 4–7 pairs of obliquely oblong or somewhat obovate, very obtuse leaflets, the terminal to 4 cm. long, 17 mm. broad, the medial about a third as large; peduncles 2.5–5 cm. long; flowers with the stamens nearly 5 cm. long, the corolla 4 times longer than the calyx, this striate, appressed pubescent, about 4 mm. long; pods ligneous, tomentose, villous, 7.5–10 cm. long, to 1 cm. broad.—Illustrated, Kunth, Mimoseae, *pl. 19.* F.M. Neg. 1250.

Cajamarca: Near Guerocotillo, Jaén de Bracamoros, *Bonpland,* type. Near Jaén, *Weberbauer 6238* (det. Harms). Cutervo, *7134.*

Calliandra portoricensis (Jacq.) Benth. in Hook. Lond. Journ. Bot. 3: 99. 1840; 543. *Mimosa portoricensis* Jacq. Icon. Rar. 3: 20. *pl. 683.* 1786–93. *C. Weberbaueri* Harms, Repert. Sp. Nov. 17: 88. 1921.

Like *C. caracasana,* and as suggested by Bentham, perhaps not distinct except that the leaflets are commonly 8–12 mm. long, 3–4 mm. broad, and the stamens typically white.—Harms in describing his species with stamens roseate except at base, merely remarked "of the relationship of *C. portoricensis,*" and in view of the apparent inconstancy of the species already proposed in the group it seems doubtful if it is possible to distinguish yet another form. *C. formosa* (Kunth) Benth., 542, also of this affinity, and perhaps extending from Bolivia, may be distinguished by its 4–8 pairs of leaflets 12–18 mm. long. F.M. Neg. 1268 (*C. Weberbaueri*).

Huancavelica: Valley of the Río Mantaro, *Weberbauer 6511* (type, *C. Weberbaueri*).—Apurímac: Oropeza Valley, *Vargas 9773.* Without locality, *Ruiz & Pavón.* Bolivia to Mexico. "Ichipicui."

Calliandra prostrata Benth. Trans. Linn. Soc. 30: 554. 1875.

Prostrate, much branched, the younger thick tortuous branchlets minutely pilose; leaves small, crowded, the 2–4 pairs of pinnae with 8–12 pairs of slightly lustrous narrowly linear leaflets, these scarcely 2 mm. long; flower-heads with leaves on very short branchlets or crowded at foliate nodes, 4–6-flowered, the slender peduncles 2–4 mm. long; calyx 1.5 mm. long, the corolla hardly 4 mm. long, the tube of the rather few stamens included.—Except for the more numerous pinnae this seems from description to be similar to *C. expansa.*

Arequipa: Rocky slopes north of Mollendo, *Worth & Morrison 15748.*—Without locality, (*McLean* in Herb. Hook., type).

Calliandra rotundifolia Killip & Macbr., spec. nov.

C. carbonaria peraffinis; petiolo communi haud incrassato 1.5–5 cm. longo; foliolis semper unijugis longe et acute acuminatis; pedunculis vix 4 mm. longis; corolla obscure striata; staminum tubo breviter exserto.—It could be treated as a variety of *C. carbonaria* or *C. trinervia* (cf. under *C. amazonica*); the 2 leaflets form nearly a circle. Flowers wine-red (Klug).

Loreto: Mishuyacu, *Klug 421* (type, U. S. Nat. Mus.).

Calliandra tumbeziana Macbr. Field Mus. Bot. 8: 89. 1930.

Branchlets white, glabrous; stipules ovate-lanceolate, acuminate, striate; pinnae 3–5 pairs, mostly 1.5 cm. long, the rachi densely ciliate-hirsutulous; leaflets 15–30 pairs, scarcely lustrous, oblong-linear, acute, 1.5–2.5 mm. long; peduncles glabrate or little pilose, 2.5–4 cm. long; calyx striate, 2 mm. long, the obtuse teeth ciliate, more than twice exceeded by the corolla, the white stamens about 2 cm. long, the tube slightly if at all exserted.—Apparently nearest *C. expansa;* shrub 3 meters high in deciduous bush-wood.

Tumbez: East of Hacienda Chicama, *Weberbauer 7677*, type.

7. LYSILOMA Benth.

Altogether like *Acacia* in appearance and character but the Peruvian species unarmed and, especially, the usually 12–30 (50) stamens more or less connate into a tube and the elongate submembranous pods with persisting margins from which at maturity or in age the valves separate.—*Dugandia rostrata* (H. & B.) Britton & Killip has stamens free except that some of them are annulately joined at base;

its pods however are similar to those of *Lysiloma* (to which genus Bentham referred it) except that they break into 1-seeded joints as do those of *Mimosa*. Both *Lysiloma* and *Dugandia* therefore are arbitrary enough genera but conveniently maintained by the taxonomist as connecting links between the groups that account naturally for the majority of the species.

Lysiloma polyphylla (Clos) Benth. Trans. Linn. Soc. 30: 535. 1875. *Acacia polyphylla* Clos in Gay, Fl. Chile 2: 254. 1846.

Branchlets slender; pinnae 3–8 pairs with many linear inequilateral mucronulate leaflets, 4–6 mm. long, firm, minutely and rather sparsely, at least beneath, puberulent with lustrous trichomes, the midnerve submarginal; rachis glands small or obscure; peduncles 2.5–3.5 cm. long, binate or fasciculate, the heads dense; calyx membranous, 2 mm. long, the corolla nearly 4 mm. long, shortly 4-toothed; stamens nearly 50, about 12 mm. long, the tube nearly as long as the corolla; pods membranous, to 12 cm. long, nearly 2 cm. broad, shortly stiped, rounded at tip and apiculate; seeds brown, lustrous, flattened, 8 mm. broad, 10 mm. long.—Although the pod has opened there is no indication that the valves will separate from the nerviform margins in the Peruvian specimen. F.M. Neg. 1225.

Arequipa: Below Chuquibamba, 1,800 meters, *Weberbauer 6846* (det. Harms). Bolivia; Chile (cultivated).

8. ACACIA Willd.

Reference: Benth. Trans. Linn. Soc. 30: 444–533. 1875.

With most of the characters of *Mimosa*—and these as variable—but the stamens indefinite, free or slightly connate at base. The stipules are often spinescent, the calyx often tubular or campanulate. Pods ovate, oblong or linear, straight to contorted, continuous within or variously divided, 2-valved, indehiscent, or very rarely breaking into 1-seeded joints. Seeds transverse or longitudinal, the funicle filiform or variously dilated into a fleshy aril.—Besides the following, Weberbauer lists *A. tortuosa* (L.) Willd., a species of the West Indies and Colombia, his specimens no doubt referred to one or the other of the first three species in the key. There are also three specimens in fruit which I have not succeeded in placing but which apparently are Acacias with spicate flowers; all are trees according to the collectors, the prickles few and obscure: *Cook & Gilbert 1485* and *1710* with native name "Huillca" have 8–12 pairs of pinnae, the leaflets 3–4 mm. long, closely ciliate, the rachis spreading pilose-

puberulent, the pods 12 cm. long, nearly 3 cm. wide, shortly acuminate at both ends, shortly stiped, densely puberulent; *Killip & Smith 2315* from Puerto Yessup is somewhat similar but the leaflets are glabrous or appressed and sparsely ciliate, 5–6 mm. long, the densely puberulent pods rounded at tip, apiculate, 2 cm. wide.

Ducke, Archiv. Jard. Bot. Rio Jan. 4: 31. 1925, has presented a perfect case against the segregation of the genus on the basis of the presence or absence of a gland on the anthers.

Flowers capitate, the inflorescences few; stipular spines often conspicuous.
  Leaflets 1 mm. wide or wider ..... *A. farnesiana.*
  Leaflets minute.
    Prostrate or spreading, low shrub ..... *A. huarango.*
    Tree with erect trunk ..... *A. macracantha.*
Flowers spicate or capitate, the inflorescences many, paniculate; plants smooth or prickles scattered.
  Flowers spicate.
    Leaflets 3–4 mm. long, ciliolate; tree ..... *A. Weberbaueri.*
    Leaflets 6 mm. long or longer; lianas.
      Leaflets many, small.
        Leaflets linear, scarcely 1 mm. wide ..... *A. Kuhlmannii.*
        Leaflets oblong, 2–3 mm. wide.
          Pods puberulent; leaflets puberulent beneath. *A. paraensis.*
          Pods glabrous; leaflets glabrous at least at maturity. *A. Macbridei.*
      Leaflets 2–4 pairs, ample ..... *A. altiscandens.*
  Flowers capitate.
    Leaflets few or if many, 6–9 mm. long, (2) 3–4 mm. wide; plants without prickles.
      Leaflets 4–8 pairs, ample ..... *A. Klugii.*
      Leaflets many, small.
        Midnerve of leaflets (these 12–25 pairs) lateral. *A. glomerosa.*
        Midnerve of leaflets (these 30–50 pairs) nearly marginal. *A. polyphylla.*
    Leaflets narrower, usually shorter; plants prickly except *A. boliviana*, rarely *A. riparia.*

Corolla at most twice as long as the calyx.
Flowers sessile.
Prickles recurved, at least those toward or in the inflorescence.
Anthers eglandular; inflorescence tomentulose. *A. multipinnata.*
Anthers in bud glandular; inflorescence puberulent. *A. paniculata.*
Prickles minute, ascending or straight, few. *A. loretensis.*
Flowers pedicellate..... *A. boliviana.*
Corolla to 4 times as long as the calyx, tubular, 3–5 mm. long. *A. riparia.*

Acacia altiscandens Ducke, Archiv. Jard. Bot. Rio Jan. 3: 72. 1922.

Vigorous shortly and sparsely aculeate liana, glabrous except for the more or less ashy-puberulent petioles, leaf-rachi and leaflets beneath (on the nerves) and panicles, these ample, lax, the spikes to 3 cm. long; petiole gland conspicuous; pinnae and leaflets usually 3 pairs or the latter sometimes 4 pairs, the upper leaflets gradually larger, all oblique at base, falcate-acuminate, 5–10 cm. long, 2–5 cm. broad; flowers sessile, ashy-puberulent, known only in bud; pods 2.5 dm. long or longer, 4.5 cm. broad, brownish-gray with an extremely fine tomentum, stiped, chartaceous-coriaceous, transversely veined.—Stamens, according to the author, evidently numerous, the anthers glandular, but the species unique in foliage except for *A. Klugii* with the flowers in heads. F.M. Neg. 27893.

Peru (probably). Amazonian Brazil.

Acacia boliviana Rusby, Bull. N. Y. Bot. Gard. 4: 348. 1907.

Unarmed shrub with stout somewhat flexuous striately angled branches; stipules 3–5 mm. long, linear-subulate, subpersisting; petioles eglandular; pinnae 10–20 pairs with many oblong-linear leaflets, these 3–4 mm. long, less than 1 mm. broad, obliquely truncate at base, acutish, glabrous except for the softly ciliate margins, paler beneath, veinless except for the midnerve that is little excentric; peduncles mostly in axillary racemes, like the leaf-rachi lightly villous, the trichomes incurved or ascending; flower-heads with the stamens 6–10 mm. thick, the flowers glabrous,

distinctly but shortly pedicellate; calyx less than 1 mm. long, the corolla 2.5 mm. long; pods 4–6 cm. long, 1 cm. broad or slightly broader, the stipe about 7 mm. long, and abruptly pointed, the point 3–4 mm. long.—This evidently is nearly *A. filicoides* (Cav.) Trel. in which Bentham, 532, included material from Colombia to the southeastern United States, which interpretation however was probably too broad.

Peru (probably). Bolivia.

Acacia farnesiana (L.) Willd. Sp. Pl. 4: 1083. 1805; 502. *Mimosa farnesiana* L. Sp. Pl. 521. 1753. *Vachellia farnesiana* (L.) Wight & Arn. Prodr. Fl. Ind. Or. 272. 1834.

Shrub or small tree, the gray straight stipular spines 5–25 mm. long or longer, the somewhat arcuate branchlets glabrous or puberulent, lenticellate; pinnae ordinarily 2–3 pairs on the flowering branchlets, 4–5 pairs on the sterile; leaflets many, glabrous or nearly, mostly 4 mm. long, the midnerve prominent beneath; peduncles often panicled in the axils to 3 cm. long, the globose heads 6 mm. thick without the stamens, these yellow, 50 or more; calyx 1–1.5 mm. long; pods cylindric, spongy or more woody, glabrous, often curved, 4–7 cm. long, 8–15 mm. thick.—The type was a tree cultivated in the early seventeenth century in the garden of Farnesi from which the name. The fragrant flowers have been much used in the manufacture of perfume, particularly in the south of France. Illustrated, Degener, Fl. Hawaii. 1: *pl. 27.*

Loreto: Río Huallaga, *Williams 4914.* Río Ucayali, *Killip & Smith 26884.* Perené, *Killip & Smith 25405.* Near Iquitos, *Klug 677.*—San Martín: Tarapoto, *Williams 6274.*—Junín: La Merced, *5409; Killip & Smith 23822.* Warm America; widely distributed elsewhere. "Aroma," "flor de aroma."

Acacia glomerosa Benth. in Hook. Lond. Journ. Bot. 1: 521. 1842; 528. *Senegalia glomerosa* (Benth.) Britton & Rose, N. Amer. Fl. 23: 116. 1928.

Nearly *A. polyphylla* but with fewer (6–8) pairs of pinnae and the leaflets obliquely oblong, mostly 8–12 mm. long, 4 mm. wide, the midnerve strongly excentric; pods to 17 cm. long, 4 cm. wide, the valves firm-chartaceous or scarcely coriaceous.—To 14 meters (Mexia). Flowers bright yellow (Ule); white (Klug). F.M. Neg. 1277.

Loreto: Pongo de Manseriche, *Mexia 6258* (det. Standl.). Yurimaguas, *Klug 2784.*—San Martín: Tarapoto, *Ule 6644* (det. Harms);

Spruce 4408. Juanjuí, flowers cream, *Klug 4196* (det. Standl.). Venezuela; Brazil; Colombia and Central America. "Pashaco" (Mexia).

Acacia huarango Ruiz ex Macbr. Field Mus. Bot. 8: 90. 1930.

Prostrate, diffuse or suberect but always low, the young branchlets puberulent, becoming glabrate, the stipular spines mostly 2–3 cm. long; pinnae 5–10 pairs; leaflets 1–2 mm. long; pods villous-puberulent, oblong-cylindric, 7–10 cm. long, 10–12 mm. thick.—Perhaps better treated as a variety of *A. macracantha* but with fewer pinnae and, in the same locality, different in habit. The collections from southern Peru may be *A. macracantha.*

Piura: Pariñas Valley, spreading shrub seldom 1 meter high, *Haught F78.* La Brea, *Horton 11576.*—Libertad: Trujillo, *Seler 263.*—Lima: San Lorenzo, *Gaudichaud.* Chosica, prostrate in mats, *250.*—Huánuco: Near Huánuco, low spreading shrub, *Ruiz & Pavón,* type; *1364; 2034.* Chulki, *Sawada P125.*—Cuzco: Limatambo and Arabito, 2,750 meters, *Vargas 450; 451.* Valle del Apurímac, (*Herrera 1183*). Nayhua, *Vargas 504.* "Huarango."

Acacia Klugii Standl. in herb.

Speciei *A. altiscandens* similis differt aculeis ut videtur nullis, foliolis 4–8 jugis, majoribus 2–3 cm. longis, 1.5–2 cm. latis, vix acutis, subtus glabratis etiam ad nervos; floribus 4 mm. longis, calyce glabro, corolla adpresse puberula.—According to the collector a tree, 15 meters high; the author has not indicated a relationship.

San Martín: Juanjuí, *Klug 4272,* type.

Acacia Kuhlmannii Ducke, Archiv. Jard. Bot. Rio Jan. 5: 123. 1930.

High climbing, the stems abundantly armed with recurved prickles; pinnae 12–16 pairs with many sparsely ciliolate leaflets little more than 0.5 mm. broad, about 6 mm. long; inflorescence rusty-puberulent, often elongate, the spikes 2.5–4 cm. long; calyx and corolla both puberulent, the former scarcely 1 mm. the latter scarcely 2 mm. long; anthers in bud with a rudimentary or minute subhyaline often stipitate gland; ovary villous, shortly stiped; pods puberulent to 12 cm. long, 2.5 cm. broad.—Description of pods from *Killip & Smith 26315* and *Cook & Gilbert* specimens which may not belong here. Ducke remarks that the anther-gland is not dark-colored as in the related *A. lacerans* Benth., 523, and *A. Huberi*

Ducke, l.c., both species to be expected; both have much larger flowers, 4 mm. long, *A. Huberi* being ashy-puberulent, the leaflets puberulent beneath, while the leaflets of *A. lacerans* are glabrous. *A. amazonica* Benth., 523, is sparsely aculeate, the narrowly linear leaflets paler but glabrous beneath, the often glabrous flowers with corolla nearly 4 mm. long, 3–4 times longer than the calyx. The negative is of *Tessmann 3256*, tentatively proposed by Harms in herb. as a new species. F.M. Neg. 1275.

Ayacucho: Río Apurímac Valley, *Killip & Smith 22953*.—Loreto: Chachito Playa, *Tessmann 3256*. Río Mazán, *José Schunke 256*. Brazil. "Pashaquilla."

Acacia loretensis Macbr., spec. nov.

Arbor; ramulis glabris vel glabratis vix striatis; aculeis paucis minutis curvato-adscendentibus vix 0.5 mm. longis; pinnis circa 12-jugis; foliolis 30–50 jugis anguste falcato-oblongis acutiusculis, 4 (6) mm. longis, vix 1 mm. (–1) latis supra glabris, subtus adpresse sparseque puberulis et pallidioribus, costa fere marginale; paniculis obscure puberulis, laxis, capitulis breviter pedunculatis; calyce 1 mm. longo dentibus obscure puberulis; corolla fere 2.5 mm. longa cinereo-puberula.—The only other species at all similar with ascending prickles that has come to my notice is A. **Lehmannii** (Britton & Killip) Macbr., comb. nov. (*Senegalia Lehmannii* Britton & Killip, Ann. N. Y. Acad. Sci. 35: 145. 1936), of Colombia, much more pubescent, flowers glabrous. The Killip & Smith collection has slightly larger leaflets, the pods 9 cm. long, nearly 2 cm. wide, membranous, glabrous, those of the Krukoff specimen 12 cm. long, 2.5 cm. wide.

Loreto: Gamitanacocha, Río Mazán, tree, 10 meters, flowers white, river bank, *José Schunke 157*, type. Mishuyacu, *Klug 1073*. Río Paranapura, *Klug 3956* (det. Standl., *A. glomerosa*). Río Itaya, 10-meter tree, *Killip & Smith 29537* (probably).—Río Acre: Mouth of Río Macauhán, *Krukoff 5419* (distr. as *A. polyphylla*). "Pashaco."

Acacia Macbridei Britton & Rose, in herb.

Ut videtur *A. paraensis* peraffinis; pinnis ad 14-jugis; foliolis glabris vel parcissime puberulis et ad basin barbatulatis; floribus subpedicellatis glabris; leguminibus stipitatis (stipite rare 1 cm. longo) glabris, ad 18 cm. longis, 3 cm. latis plus minusve venosis.—At one time I referred this to *A. paraensis* but in view of the difference noted it seems probable that it is distinct. Of course one cannot be certain that the specimen in flower (*Mexia 6327*) is actually

the same; the stem is less angulate but the leaves including the leaflets are identical. Like the Ducke species its relationship is probably with *A. amazonica* Benth. with "narrowly linear" leaflets.

Junín: La Merced, in débris along river, *5326*, type.—Huánuco: Pozuzo, open places along river, *4584*.—Loreto: Pongo de Manseriche, at water's edge, *Mexia 6263* (det. Standl.) and on first island, *Mexia 6327* (det. Standl. as sp. nov. in herb.).

Acacia macracantha Humb. & Bonpl. ex Willd. Sp. Pl. 4: 1080. 1806; 500. *A. pellacantha* Meyen ex Vog. Nov. Act. Acad. Leop.-Carol. 19: Suppl. 1: 19. 1843.

Small thorny tree with mostly flat and spreading but sometimes pointed crown; branchlets often ashy-tomentulose, rarely glabrous; stipular spines slender becoming 2.5 to several cm. long; pinnae 10–60 pairs with 20–30 pairs of nearly minute leaflets or these rarely more than 3 mm. long; peduncles usually 2 or 3 in the axils to about 2 cm. long, the flower-heads with the stamens 6 or 7 mm. thick; pods puberulent, subterete, straight or curved, 5–10 cm. long, 6–12 mm. thick.—Apparently Bentham's interpretation of the species as highly variable in indument, spines and pods is correct, but Britton and Killip apply the name only to the form described here. It is cultivated along watercourses near the coast. Illustrated, Kunth, Mimoseae, *pl. 28*. F.M. Neg. 1278.

Tumbez: Tumbez, *Weberbauer 7730*.—Piura: Negritos, *Haught F101*. Paita, *Haught 56*.—Cajamarca: Below Santa Cruz, (Weberbauer, 189). Valley of the Utcubamba, (Weberbauer, 191).—Lambayeque: (*Raimondi*).—Libertad: Pacasmayo, *Rose & Rose 18525*. Chepen, *Goodspeed 10011*. Trujillo, *Killip & Smith 21519*.—Ancash: Tambo de Pariocota, *2548*.—Huánuco: Conchamarca, *Woytkowski 134*.—Lima: Matucana, *554*. Callao, *Née; Sargent; Wilkes Exped.* Chosica, *498*. San Geronimo, *5902*.—Arequipa: (Weberbauer, 130).—Ayacucho: Huanta, *Killip & Smith 23338*.—Tacna: *Meyen* (type, *A. pellacantha*). Ecuador. "Taque," "espino."

Acacia multipinnata Ducke, Archiv. Jard. Bot. Rio Jan. 4: 31. 1925. *Senegalia tomentella* Britton & Killip, Ann. N. Y. Acad. Sci. 35: 145. 1936.

Similar to *A. paniculata* but the anthers without a gland; rachis of the leaves and peduncles yellowish-puberulent-tomentulose, the white flowers nearly glabrous; pods not readily dehiscing, about 13 cm. long, 2–2.5 cm. broad, shortly stiped, rigid chartaceous, not

pilose but densely dark punctate.—The type of *S. tomentella* is *Klug 1651* from the Río Putumayo at the Colombia-Peru boundary; the flowers are puberulent, not glabrous as described, the anthers eglandular. I am not convinced that the character is significant here; apparently the glands may be translucent or poorly developed. Certainly there is no concomitance in number of pinnae as Ducke has thought, because in type of *A. paniculata* these are more than 30 pairs.

Loreto: Yurimaguas, *Tessmann 5511* (det. Harms, *A. paniculata*, but anthers eglandular).—Río Acre: At the Río Abunam, (*Kuhlmann*). Brazil.

Acacia paniculata Willd. Sp. Pl. 4: 1074. 1806. *Senegalia paniculata* (Willd.) Killip, Trop. Woods 63: 6. 1940.

Scandent with straight or mostly recurved and often numerous prickles, the branchlets, petioles and panicles more or less puberulent; petioles with depressed gland near base, 10–15 cm. long, the 10–32 pairs of pinnae ordinarily 2.5–4 (5) cm. long; leaflets 20–60 pairs, 2–3 mm. long, linear-oblong, acute, the midnerve submarginal; peduncles fascicled, about 1 cm. long, borne in axillary and terminal inflorescences; calyces 1.5 mm. long, the corollas about one-third larger; pods to 2.5 dm. long, to 3.5 cm. wide, evanescently puberulent, coriaceous.—The more or less promptly deciduous gland on the anthers in bud typically is dark-colored, often visible in early anthesis on some anthers. Cf. my *5544* under *A. Weberbaueri*. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 102*. F.M. Neg. 1282.

San Martín: Tarapoto, (*Ule 6623; Spruce 4480*).—Loreto: Fortaleza, *Klug 2802* (det. Standl., *A. polyphylla*). Rancho Indiana, *Mexia 6432* (det. Standl.). Caballo-Cocha, *Williams 2097* (det. Standl., *A. polyphylla*). Río Nanay, *Williams 298* (probably, but sterile). Bolivia; Brazil to West Indies. "Pasha quilla" (Mexia).

Acacia paraensis Ducke, Archiv. Jard. Bot. Rio Jan. 3: 73. 1922.

Scandent, the branchlets rather sparsely recurved aculeate and minutely, as the leaf-rachi and peduncles, puberulent or glabrate; stipules narrowly subulate, somewhat persisting; petiolar gland large; pinnae 4–9 pairs with 15–32 pairs of falcate-oblong acute leaflets, 8–13 mm. long, 1.5–3 mm. broad, opaque, paler and more or less puberulent beneath, the midnerve somewhat excentric; flowers sessile, glabrous, the calyx about 2 mm. long, the white corolla 4.5 mm. long; anthers glandular; ovary villous, stipitate; pods charta-

ceous, plane, 12–15 cm. long, 2.5–3.5 cm. broad, densely puberulent, on stipes 1.5 cm. long.—Apparently nearly *A. velutina* Benth. except that the more southern species has puberulent, slightly shorter flowers. According to Ducke the relationship is probably with *A. amazonica* Benth. with striate stipules, more numerous pinnae and corolla 3–4 times longer than the calyx. Other relatives include *A. alemquerensis* Huber, Bol. Mus. Goeldi 5: 380. 1909, with obtuse or retuse leaflets, 5–6 mm. broad, and *A. articulata* Ducke, l.c., the leaflets puberulent both sides, the shortly stiped pods coriaceous, 8–12 cm. long or longer to 2 cm. broad, breaking into 8–12 indehiscent segments. F.M. Neg. 27902.

Peru (probably). Brazil.

Acacia polyphylla DC. Prodr. 2: 469. 1825; 528. *Senegalia polyphylla* (DC.) Britton & Rose, Ann. N. Y. Acad. Sci. 35: 142. 1936.

Tree, the younger parts puberulent or glabrate; petioles 10–14 cm. long with medial scutellate gland and glands between the pinnae, these in 12–20 pairs; leaflets 30–50 pairs, narrowly falcate-oblong, plane or a little convex above, acutish, to 6 mm. long, 2–4 mm. wide, the midnerve submarginal; panicles ample, much-branched; peduncles 4–6 mm. long, fasciculate; heads 6 mm. thick without the stamens; calyces and especially the corolla ashy-puberulent; pods stiped, subcoriaceous, 12–14 cm. long, 3 cm. wide.—Doubtfully in Peru, the following collections probably incorrectly determined. F.M. Neg. 33452.

Río Acre: (*Ule 9437*). Iquitos, (*Tessmann 5125*, det. Harms). To Venezuela and Colombia. "Pashaco."

Acacia riparia HBK. Nov. Gen. & Sp. 4: 276. 1824; 528. *A. tubulifera* Benth. in Hook. Lond. Journ. Bot. 1: 520. 1842; 527. *Senegalia riparia* (HBK.) Britton & Rose, Ann. N. Y. Acad. Sci. 35: 144. 1936.

Typically glabrous or nearly except the puberulent panicles, scandent, the prickles few, stout, recurved, sometimes a few on the petiole and rachis, the former with 1 large gland, the latter with at least 2 smaller ones; pinnae usually fewer than 12 pairs with many linear leaflets, these 4–6 mm. long, 1–1.5 mm. wide, obtuse, concolor, glabrous or obscurely ciliolate, oblique at base, the midnerve only slightly excentric; peduncles 6–12 mm. long, solitary or geminate or the upper in racemose fascicles; calyx puberulent, 1 mm. long, the

corolla about 4 times as long, glabrous except the tip; pods stipitate, 1–2 dm. long, 1.5 cm. wide, membranous, venose, puberulent, the 8–10 seeds subrotund-elliptic, lustrous.—Most of the material in herbaria must belong to some other species, probably to one of those listed as synonyms by Bentham; *M. retusa* Jacq., based on a fruiting specimen from Colombia, does not seem to have been considered by Britton and Killip.

Cajamarca: Jaén, *Weberbauer 6190* (det. Harms). Confluence of the rivers Amazon and Chamay, Prov. Jaén, (*Bonpland*, type).—San Martín: Zepelacio, 1,200 meters, liana with cream-colored flowers, *Klug 3611* (det. Standl., *A. polyphylla*).—Junín: Puerto Yessup, *Killip & Smith 26343*.—Locality not known, (*Mathews 1568*, type, *A. tubulifera*). Colombia?

Acacia Weberbaueri Harms, Repert. Sp. Nov. 16: 351. 1920.

Branchlets subangled, the younger softly puberulent, glabrous in age, with a few small prickles or these sometimes lacking; leaf-rachis puberulent, 6–13 cm. long, the pinnae 10–22 pairs; leaflets numerous, oblong-linear, obtuse or scarcely acutish, 3–4.5 mm. long, sparsely ciliate-puberulent or glabrate, the midnerve strongly excentric; peduncles axillary, fascicled or the terminal racemose, the inflorescence exceeded by the leaves, the rachi velutinous-puberulent; calyx and corolla puberulent, the former 2.5, the latter 3–3.5 mm. long.—Type from tree 6 meters high, among other small trees and shrubs. My collection was given a herbarium name by Britton & Rose; its pods suggest those of *A. paniculata* but it is a tree and the leaves match those of *A. Weberbaueri;* the pods are glabrous, rounded at tip (not apiculate), 12 cm. long, nearly 4 cm. wide. F.M. Neg. 1290.

Cajamarca: Between Jaén and Bellavista, 600 meters, *Weberbauer 6209*, type.—Junín: La Merced, small, branched riverside tree, *5544* (in fruit).

9. MIMOSA L.

Reference: Benth. Trans. Linn. Soc. 30: 388–441. 1875.

Herbs or shrubs, sometimes scandent, or trees, unarmed or usually aculeate. Leaves bipinnate but sometimes apparently digitate, the pinnae so approximate, often sensitive, rarely none, ordinarily eglandular. Flowers small, sessile, 4–5 (3–6) -merous in globose heads or cylindrical spikes, the calyx minute, even obsolete, the petals valvate, more or less connate, the stamens only as many or twice

as many as the corolla lobes, mostly long exserted, their anthers eglandular, free or, exceptionally, shortly united.—Ovary sessile or rarely stiped, 2–many ovules. Pods oblong or linear, commonly plano-compressed, smooth or aculeate, continuous or subseptate within, the portion within the thickened margins finally breaking into 1-seeded joints.—In a few species there are neuter flowers with dilated staminodia.

Flowers in elongate spikes.

Pubescence inconspicuous; petioles with a gland.

Leaflets many, small, usually glandular beneath; stamens and petals same number.

Leaflets 16–30 pairs.....*M. myriadena.*

Leaflets 6–10 pairs.....*M. punctulata.*

Leaflets few, several cm. long, eglandular; stamens twice as many as petals.....*M. Tessmannii.*

Pubescence conspicuous; petioles eglandular; stamens twice as many as petals.....*M. caduca.*

Flowers capitate-globose, at least minutely, or short-spicate.

Pinnae 1 pair; stamens and petals same number.

Leaflets many pairs.

Leaflets minute, crowded, glabrate except for the setulose margins.....*M. pectinata.*

Leaflets several mm. long, pubescent or glabrous.

Upper stems densely pubescent with spreading plumose or papillose trichomes.....*M. boliviana.*

Upper stems glabrous or the trichomes smooth.

Stems prickly, sometimes also with stipular spines, the prickles recurved.

Stems strigose; pods 2 cm. long.....*M. insidiosa.*

Stems glabrous or nearly; pods 3–4 cm. long.
M. cuzcoana.

Stems little if at all prickly, but with geminate straight or nearly straight infrafoliar spines and pilose.
M. polycarpa.

Leaflets 2 pairs.

Leaflets acute, sometimes bluntly, villous at least beneath; pod-margins densely, -faces sparsely (if at all) setose.
M. sensitiva.

Leaflets acutish, often glabrous 1 side, or puberulent; pods strigillose, the trichomes short on margins and valves. *M. albida.*

Pinnae 2–many pairs, at least many leaves; stamens twice as many as petals except *M. pudica* and *M. polydactyla.*

Leaflets all longer than 1 cm., 1–7 pairs; petiole with a gland.

Leaflets 1 pair..... *M. extensissima.*

Leaflets 2–several pairs.

Leaflets puberulent or glabrate unless in or near axils.

Pinnae 2–3 pairs..... *M. micracantha.*

Pinnae mostly 4–6 pairs..... *M. rufescens.*

Leaflets pilose beneath on nerves, not punctate. *M. xinguensis.*

Leaflets rarely 1 cm. long, 4–many pairs; petioles with or without a gland.

Pinnae distant, the petiole short, the rachis long; stamens twice as many as the petals.

Plants not conspicuously hispid; corolla never densely striate.

Spines straight, becoming stout; petiolar or leaf-rachis gland more or less obvious.

Spines internodal; pods smooth..... *M. montana.*

Spines infrastipular; pods prickly..... *M. revoluta.*

Spines at least somewhat curved, slender and small or broadened at base; glands obscure or obsolete.

Pods to 1 cm. wide, spinose; leaf-rachis ashy-puberulent.

Flowers glabrous as also the leaflets above. *M. Weberbaueri.*

Flowers puberulent as the leaflets both sides. *M. dichoneuta.*

Pods 1.5–2 cm. wide, sparsely and minutely prickly; leaf-rachis usually sparsely puberulent or glabrate. *M. acantholoba.*

Plants conspicuously hispid or prickly and then usually also pilose on the corollas, firm and obviously striate.

Corolla membranous, not striate.

Pubescence setulose, the prickles few..... *M. pigra.*

Pubescence pilose or wanting, the prickles many. *M. invisa.*

Corolla firm, multistriate..... *M. somnians.*

Pinnae digitately crowded, the petiole elongate; stamens and petals same number.

Pinnae mostly 2 pairs..... *M. pudica.*

Pinnae mostly 4–5 pairs..... *M. polydactyla.*

Mimosa acantholoba (Humb. & Bonpl.) Poir. in Lam. Encycl. Suppl. 1: 83. 1810; 426. *Acacia acantholoba* Humb. & Bonpl. ex Willd. Sp. Pl. 4: 1089. 1806.

More or less prickly shrub 1–4 meters high, obscurely puberulent; pinnae 4–10 pairs; leaflets 5–30 pairs, oblong or oblong-linear, 3–6 mm. long; peduncles slender, geminate or fascicled, 1.5–3 cm. long, borne in upper axils and racemosely at the tips of the often elongating branchlets; flower-heads with the stamens, 12–15 mm. thick; pods stiped, membranous, puberulent or glabrous, acutely narrowed at both ends, the margins finely aculeate, the valves undivided.

Tumbez: Near Hacienda Chicana, deciduous bush-wood, *Weberbauer 7666.* Cerro Viento, *Haught 73.* Locality unknown, *Weberbauer 5965; 6008.* "Serrilla," "uña de gato." Ecuador.

Mimosa albida Humb. & Bonpl. ex Willd. Sp. Pl. 4: 1030. 1806; 390. *M. floribunda* Willd. l.c. 1031.

Trailing or sprawling or if shrubby the branches elongating, more or less armed with scattered recurved prickles and puberulent at least toward the tips; leaflets 2 pairs (the lower inner one somewhat reduced), obliquely oblong, obtuse or acutish, typically appressed strigillose both sides, the trichomes white, fine, short, often more numerous and mixed with coarser ones beneath; upper peduncles borne in a long often leafless terminal raceme; corolla in type glabrous except at tip; pods pubescent with appressed or incurved rigid trichomes often intermixed with a finer puberulence.—Flowers mostly bright or deep red. As shown by Robinson, Proc. Amer. Acad. 33: (Contr. Gray Herb. 13:) 310. 1898, the species is polymorphous but it seems distinct at least over most of its range from the more southeastern *M. sensitiva.* The many variants of *M. albida,* of little interest, include var. *floribunda* (Willd.) Robins., l.c. 311, leaflets glabrous above, appressed setulose beneath, the corolla puberulent; var. *strigosa* (Willd.) Robins., leaflets coarsely strigose both sides; var. *erratica* Macbr. Field Mus. Bot. 8: 91. 1930, leaflets glabrous

or with a few scattered setae beneath. The last suggests the Central American var. *glabrior* Robins. with, however, glabrous flowers. It may be remarked that if *M. floribunda* is treated as a species it must be called *M. Willdenowii* Poir. in Lam. Encycl. Suppl. 1: 50. 1810, not *M. floribunda* Vent.; academic perfectionists have written the name *Willdenovii*. F.M. Negs. 1295; 1323 (*M. floribunda*).

Piura: Cerro Viento, *Haught 98* (var. *floribunda*).—Libertad: Trujillo, *Killip & Smith 21518*. Moche, *Bonpland*, type.—Ancash: Pampa Romas, *Weberbauer 3177*. Above Samanco, 200 meters, Weberbauer, 163. Tambo de Pariocota, *2552* (var. *erratica*).—Lima: Chosica, river bottom, *2858* (var. *erratica*).—Arequipa: East of Chala, sandy soil, *Worth & Morrison 15622* (det. Johnst., *M. floribunda*).—Cuzco: *Gay*.—Puno: Near Paraíso, (*Raimondi*). To Venezuela and Panama.

Mimosa boliviana Benth. Trans. Linn. Soc. 30: 396. 1875.

Shrub, the elongate branchlets densely rusty-pubescent with short mostly or usually minutely plumose trichomes and conspicuously armed with broad-based recurving mostly infrastipular spines, a few of these, reduced, often also on the petioles and rachi of the 2 pinnae; leaflets 20–30 pairs, oblong, mostly about 1 cm. long, 3 mm. broad, obliquely truncate at base, acutish, lustrous above, subappressed-pilose-hispid beneath, usually darkening and the margins recurving in drying; peduncles axillary, geminate, slender, pubescent like the stems, sometimes 5 cm. long, the globose heads about 12 mm. thick; calyx long ciliate-fimbriate, the twice as long pink corolla with 4 puberulent lobes.—Ornamental shrub 2–3 meters high, the corolla and stamens pink (Vargas).

The identity of the Weberbauer specimen is open to question; Harms at one time referred it (as a "variety") to *M. acerba* Benth. of southeastern Brazil, and this name was used by Weberbauer. Later he wrote on the sheet "potius *M. boliviana*." Having only a scrap before me at this writing I cannot express a definite opinion but it seems probable that it is a variety of the latter species, or new. The trichomes are merely papillose but they are not smooth as in *M. acerba*. F.M. Neg. 32034.

Amazonas: Chachapoyas, *Weberbauer 4275*(?); 190 (cf. note above).—Cuzco: Marcapata, *Vargas 1346*. Bolivia.

Mimosa caduca (Humb. & Bonpl.) Poir. in Lam. Encycl. Suppl. 1: 83. 1810; 414. *Acacia caduca* Humb. & Bonpl. ex Willd. Sp. Pl. 4: 1089. 1806.

Tree, the sparsely aculeate younger branchlets and leaflets beneath softly villous or tomentose; pinnae 4–6 pairs with 5–10 pairs of obovate oblong leaflets, 6–8 mm. long, lustrous and scarcely puberulent above; leaf-rachis unarmed, eglandular; peduncles axillary, geminate, 1.5–2 cm. long, hirsutulous, the dense flower-heads elliptic; flowers pubescent, the corolla twice as long as the calyx, the stamens 8 or 10; pods plane, rusty-tomentose, the margins aculeate, the valves articulating, to about 7 cm. long, 8 mm. broad.

Piura: On the River Cachiyacu, near Gualtaquillo, *Bonpland*, type.

Mimosa cuzcoana Macbr., spec. nov.

M. insidiosae ut videtur peraffinis; subscandens vel diffusa; ramulis glabris vel glabratis; aculeis sparsis recurvis, infrastipularibus nullis; pinnarum rachi aculeis recurvis instructa; foliolis 10–17 mm. longis, 3–5 cm. latis, glabris vel subtus (rare utrinque) plus minusve adpresse pilosis; floribus glabris; leguminis oblongis glabris 3–4 cm. longis, 7 mm. latis, margine dense aculeatis.—Description of fruits from Cook & Gilbert specimen. A puzzling form that could be referred either to *M. insidiosa* or *M. polycarpa;* the specimen by Soukup with leaflets pubescent beneath approaches the former. There is considerable resemblance to *M. Sagotiana* Benth. in leaflets but that species of the Guianas has pods 10–12 mm. broad and the related *M. schrankioides* Benth., 1-nerved leaflets.

Cuzco: Santa Ana, *Herrera 908* (det. Harms, *M. insidiosa*, affine). Pampaccahua, Prov. Convención, *Vargas 518*, type. Near Marcapata, 2,300 meters, *Vargas 9691*. Tapanmarce, *Soukup 817*(?). San Miguel, Urubamba Valley, *Cook & Gilbert 1174* (det. Killip, *M. Sagotiana*, affine).

Mimosa dichoneuta Macbr. Field Mus. Bot. 8: 90. 1930.

Closely branched, a meter or two high, the slender younger branchlets more or less ashy-puberulent and rather densely armed with mostly recurved prickles, these also present on the puberulent leaf-rachi; pinnae 4–6 pairs, about 2 cm. long, with mostly 12 pairs of obliquely oblong obtuse or acutish leaflets, 4–5 mm. long, 1–1.5 mm. broad, puberulent both sides; peduncles 1 cm. long; flowers white, about 2 mm. long, puberulent; pods shortly stiped, straight or nearly, the margins densely armed with curved prickles, the valves ashy-puberulent, disarticulating, 4–7 cm. long, 8–10 mm. broad.

Ancash: Huaraz, gravelly river bluffs, *2523*, type.

Mimosa extensissima Ducke, Archiv. Jard. Bot. Rio Jan. 3: 75. 1922.

Liana, often high climbing, the angles of the elongating puberulent branches usually densely armed with small recurved prickles; petiolar gland oblong; pinnae 1–3 pairs with 1 pair of falcate-ovate acuminate leaflets, mostly 5–10 cm. long, half as broad, lustrous above, somewhat reddish-puberulent beneath, and the 4 nerves also slightly pilose or glabrate; panicles ashy-puberulent, often several dm. long, open, the flower-heads with the stamens about 4 mm. thick, numerous; flowers 4-merous, the corollas about 1 mm. long, the filaments basally connate into a tube nearly as long as the ovary stipe.—*M. Duckei* Huber, Bol. Mus. Goeldi 5: 381. 1909(?), has very obtuse or rounded leaflets densely red punctate-puberulent beneath, the panicles reddish-puberulent. This volume was issued in two fascicles, 1907–1908, but bibliographers give the date at foot of title page. The related *M. colombiana* Britton & Killip (*M. bauhiniaefolia* Karst.) of Colombia is glabrous. According to Ducke his species is a constituent of the impenetrable "cipoal," that is, a dense vegetation of lianas. F.M. Neg. 28207.

Loreto: Near Yurimaguas, *Klug 2793* (det. Killip). Brazil.

Mimosa insidiosa Mart. Herb. Fl. Bras. 134. 1837; 395. *M. retrorsa* Benth. in Hook. Journ. Bot. 4: 364. 1842.

Divaricately branched shrub, the petioles and branchlets aculeate and harshly retrorse-strigose; stipules lanceolate, rigid, striate, 6–8 mm. long; petiole to 3 cm. long with 1 pair of pinnae 2–3 times longer; leaflets 12–20 pairs, oblong-linear, glabrous except the ciliate margins, 8–12 mm. long, 3 mm. wide, obscurely binerved; peduncles to 2 cm. long or to 2.5 cm. in fruit, racemose to the ends of the branchlets, the globose heads without stamens, nearly 8 mm. thick; stamens 4, three times longer than the 4 petals, these minutely ashy-puberulent; pods 16–18 mm. long, 5 mm. broad, aculeately setose on margins, the surfaces of the 3–4 segments sparsely setulose. —Bentham named a var. *major* Benth., the leaflets 12–18 mm. long. Apparently a form of this species has been found as near Peru as La Paz. Cf. *M. polycarpa, M. cuzcoana.*

Peru (probably). Bolivia to Argentina; Brazil.

Mimosa invisa Mart. Flora 20: Beibl. 2: 121. 1837; 436.

Scandent shrub, usually densely armed with recurved prickles and more or less pilose-hirsute; stipules setaceous; pinnae 5–6 pairs

with about 20 pairs of oblong leaflets often pilose beneath; peduncles rarely 1 cm. long, corollas about 2 mm. long, the calyx minute; pods 1.5–2.5 cm. long, 5–6 mm. broad, the margins aculeate, the bristly valves with 4–5 joints.—The spine usually between the pinnae of *M. pigra* is here replaced by a bristle. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 97.*

Peru (probably). Bolivia to Paraguay and the West Indies and Mexico.

Mimosa micracantha Benth. in Hook. Journ. Bot. 2: 131. 1840; 418.

Scandent, glabrous or somewhat puberulent, armed with minute recurved prickles; petiole to 3 dm. long or longer with a gland near base, often also between the ultimate pairs of pinnae and leaflets, the former 2–3, the latter in 1 or 2 pairs, obliquely obovate, obtuse, lustrous above, reddish punctate beneath (sometimes more or less pilose in axils), very unequal in size, the terminal often 7 cm. long, 5 cm. wide, the lower much smaller; heads globose, small (3 mm. thick), borne in ample leafless panicles; corolla tubular-campanulate; pods 5 cm. long, 18 mm. broad, plane, glabrous, smooth, with many submembranous segments.—Pods of *Killip & Smith 27222* are 3 cm. wide, 6 cm. long. Similar Amazonian species to be expected include *M. Spruceana* Benth. and *M. annularis* Spruce; the first has 3–6 pairs of pinnae and as many pairs of leaflets, softly villous beneath, while *M. annularis* has about 3 pairs of pinnae, 4–6 pairs of obliquely rhombic leaflets that are sparsely pubescent beneath.

Loreto: Iquitos, *Killip & Smith 27222.*—Río Acre: *Ule 9435* (det. Harms). Brazil.

Mimosa montana Kunth, Mimoseae 31. *pl. 10.* 1820; 427. *M. brevifolia* Humb. & Bonpl. ex Spreng. Syst. 2: 205. 1825.

Shrubs, glabrous except for an obscure and evanescent puberulence on the younger parts, the slender branchlets conspicuously spinose with straight prickles mostly solitary between the leaf nodes; pinnae 2–3 pairs with 4–6 pairs of oblong obtuse leaflets about 3 mm. long; peduncles axillary, often solitary, slender, 1 cm. long; calyx glabrous unless at tip, 1 mm. long, the glabrous corolla 2.5 mm. long; pods subsessile, glabrous, sometimes 4.5 cm. long, 6 mm. broad, breaking into 6–8 segments.—A meter or so high. *M. andina* Benth. and *M. quitensis* Benth., 427, both of Ecuador, are similar but the former has 8–10 pairs of leaflets, 6 mm. long,

corolla 3 times longer than calyx, pods 8–10 mm. broad; the latter 12–20 pairs of leaflets, nearly minute or scarcely 2 mm. long. *M. bimucronata* (DC.) Kuntze, 423, of southern Brazil, with eglandular petioles, ample panicles, having long been introduced in southern South America and Asia for hedges, may be found in cultivation in Peru. F.M. Neg. 1320.

Piura: Prov. Huancabamba, *Weberbauer 6067* (det. Harms).—Cajamarca: Near Cajamarca, *Bonpland,* type. Ecuador.

Mimosa myriadena Benth. Trans. Linn. Soc. 30: 408. 1875. *Entada myriadena* Benth. in Hook. Journ. Bot. 2: 133. 1840. *Acacia paniculaeflora* Hochst. Flora 760. 1843.

Scandent, lightly puberulent, the prickles minute, recurved, the petiolar gland scutellate, the leaves with 8–12 pairs of pinnae, the flowers in cylindric, amply panicled spikes; petioles 7 cm. long or longer, the pinnae about 3 cm. long; leaflets 20–30 pairs, obliquely oblong, obtusish, usually mucronulate, minutely strigillose and punctate-glandular beneath, 3–8 mm. long; corolla to 2 mm. long, petals and stamens each 5, the former separated nearly to base; pods to 7 cm. long, 8–10 mm. broad, shortly stiped, plane, breaking into 8–15 segments, gland-dotted.—The Peruvian plant, at least as to *Schunke 68,* lacks the glandular punctae on the leaflets beneath, and has many pinnae; otherwise, at least in absence of fruit, it seems to be indistinguishable and may become var. **egena** Macbr., var. nov. pinnis circa 22-jugis foliolis haud glanduliferis. F.M. Neg. 21882.

Loreto: Mouth of Río Santiago, *Tessmann 4424* (det. Harms). Mishuyacu, *Klug 775.* Río Mazán, *José Schunke 68* (type, var.). To Colombia(?) and the Guianas. "Pashaquilla."

Mimosa pectinata Kunth, Mimoseae 5. *pl. 2.* 1820; 396.

Younger branchlets appressed strigose and sparsely aculeate, the spines straight; leaves subsessile, the 2 pinnae rarely 2 cm. long, the 20–25 pairs of linear coriaceous leaflets 3–4 mm. long, so crowded that they appear imbricate; peduncles axillary, 5–10 mm. long, densely strigose-villous; calyx much divided into silvery setae, half as long as the appressed puberulent corolla, this with 4 lobes; pods appressed strigose, the margins appressed setulose, about 1.5 cm. long, 4 mm. broad, separating into 3 or 4 articulations.

Piura: On the Río Huancabamba, near Gualtaquillo, *Bonpland,* type.—Cajamarca: Valley of the Huancabamba, 800 meters, *Weberbauer 7114; 7117.* Locality not known, *Weberbauer 6171.* Ecuador?

Mimosa pigra L. Amoen. Acad. 4: 273. 1755; 437. *M. asperata* L. Syst. Nat. ed. 10: 1312. 1759.

Harshly pubescent shrub, the long branches armed with scattered recurved prickles, these often extending to the long leaf-rachi which bear 8–15 pairs of divaricate pinnae; leaflets many, sometimes 40 pairs, oblong-linear, 4–6 mm. long, usually slightly appressed hispid only beneath, the margins ciliate; peduncles solitary or geminate, 1–3 cm. long; flowers 4-merous, pink-lilac, the calyx about 2 mm. long, ciliate, the corolla twice as long, hispidulous at tip; pods generally several in each head, 3–6 cm. long or longer, about 1 cm. wide, apiculate, inordinately setose, finally breaking into many short joints.—The leaflets are sensitive to touch and collapse or droop. Illustrated, Kunth, Mimoseae, *pl. 9.*

Loreto: Yurimaguas, *Williams 4990; 5090.* Río Nanay, *Williams 601.* Near Iquitos, *Klug 934.* Pebas, *Williams 1992.* Near mouth of Río Tigre, *Killip & Smith 27517.* Rancho Indiana, *Mexia 6427.* Warm America and Africa. "Pingahuisacha."

Mimosa polycarpa Kunth, Mimoseae 8. *pl. 3.* 1820; 396.

A shrub with terete striate pilose aculeate branchlets, the spines geminate below the base of the petioles, conical, subulate, straight, to 6 mm. long; stipules hispid, acuminate, 6 mm. long; petioles to 16 mm. long, hispidulous; leaflets 20–22 pairs, oblong-linear, acute, to 10 mm. long, about 2 mm. broad, glabrous above, appressed-pilose beneath and on the margins; peduncles axillary, to 1 cm. long in fruit; flowers 4-merous, glabrous, the calyx minute; pods oblong, 16–18 mm. long, 5 mm. broad, pilose-hispid, the margins densely setose-spinose, with 3–4 segments.—Description after Kunth. In the type the prickles are at first slightly curved. This is the earliest name for a group of extremely closely related forms included by Bentham in series *Castae* and *Pectinatae;* much herbarium material from south and east of Peru referred here, probably because of the stipular spines, apparently should be included rather in *M. insidiosa* or related species, the spines being curved, often solitary, although the latter species as to type seems to have only scattered prickles. F.M. Neg. 1359.

Cajamarca: Near Cajamarca, *Bonpland,* type. Chota, *Raimondi.* Cayacati, *Raimondi.*—Junín: Montañas de Huancayo, (*Raimondi*). To Colombia.

Mimosa polydactyla Humb. & Bonpl. ex Willd. Sp. Pl. 4: 1033. 1806; 397.

Similar to *M. pudica* but the pinnae 4–5 (rarely 3) pairs, the leaflets often twice as many and usually somewhat smaller, the pods so numerous that they form a globose head, their margins densely echinate with yellowish bristles. Stems often densely long-hirsute.—Illustrated, Kunth, Mimoseae, *pl. 5*. F.M. Neg. 1358.

Loreto: Iquitos, *Killip & Smith 26892; Klug 145*. Caballo-Cocha, *Williams 2066*. Brazil to Colombia and the Guianas.

Mimosa pudica L. Sp. Pl. 518. 1753; 397. *M. hispidula* HBK. Nov. Gen. & Sp. 6: 252. 1824.

Low laxly growing more or less ligneous lightly pubescent or glabrate herb (or often shrubby), armed mostly below the stipules with a few incurved prickles; pinnae 2.5–5 cm. long, mostly 2 pairs (or rarely 1) borne almost together near the tip of the slender petiole, this about as long, the numerous oblong-linear ciliolate leaflets 6–10 mm. long; peduncles axillary or sometimes racemosely terminal, solitary or 2–3, about as long as the petioles; heads ellipsoid, 1 cm. long, the 4 petals and 4 stamens pinkish or violet; pods few to many, oblong, usually about 15 mm. long, 3–4 mm. wide, glabrous except the setose margins, the segments 3–4 (2–5).

Sensitive to irritation; the collapse of the leaflets is said to be caused by a sudden change in the position of water from the cells of the pulvinus to adjacent air-spaces, the cells regaining their turgidity as the water is slowly reabsorbed, the leaves again stiffening. Often seen in greenhouses as a "sensitive plant." Varying from forma *hispidior* Benth. to forma *glabrior* Benth. The related *M. polydactyla* HBK. is more robust, the apparently digitate leaves with 3, usually 4–5 pairs of pinnae, the pods marginally more densely echinate and often so numerous as to form globose heads. Sometimes 1 meter high. Illustrated, Degener, Fl. Hawaii.

Loreto: Iquitos, *Klug 768; Killip & Smith 26891*. Yurimaguas, *Williams 4032; 7850*. Río Nanay, *Williams 453*.—Cuzco: Paucartambo, *Herrera 3*. Warm America; introduced into tropical Asia and Africa.

Mimosa punctulata Spruce ex Benth. Trans. Linn. Soc. 30: 408. 1875.

Closely related to *M. myriadena* and similar in most respects but the branchlets typically remotely or finely prickly, the leaves with only 3–6 pairs of pinnae, each with 6–10 pairs of obliquely obovate or rounded leaflets, glabrous except for some minute scattered

glands beneath, mostly 12–18 mm. long, about 7 mm. broad, broadly rounded at the tip, truncate at base.—*Killip & Smith 29383* is densely prickly. F.M. Neg. 1362.

Loreto: Rancho Indiana, *Mexia 6433* (det. Standl., *Entada polyphylla*). Florida, *Klug 2006; 2356*. Mishuyacu, *Klug 881*. Río Itaya, *Killip & Smith 29383*. Brazil. "Pashaquilla."

Mimosa revoluta (Kunth) Benth. in Hook. Journ. Bot. 4: 409. 1842; 425. *Acacia revoluta* Kunth, Mimoseae 84. *pl. 26*. 1820. *M. gonoclada* Benth. Trans. Linn. Soc. 30: 427. 1875. *M. soratensis* Benth. l.c.(?)

Glabrous or glabrate, the stout somewhat angled branches and branchlets conspicuously armed with broad-based straight, mostly stipular and often geminate spines; petioles, or at least the leaf-rachis between the lowest of the 2–6 pairs of pinnae, with a depressed orbicular or scutellate gland; leaflets lustrous or early puberulent, 4–10 (15) pairs, oblong, obtuse or acutish, ordinarily 7 mm. long, 2 mm. broad, the midnerve submarginal; peduncles soon axillary and becoming 2–4 cm. long, flowers typically in globose heads, 5-merous, glabrous or the calyx a little ciliate, the corolla about 3 mm. long; pods sessile, curved or circinate, typically densely spinose, 4 cm. long or longer, nearly 1 cm. broad.—The glands appear to develop in varying degree. *M. soratensis* seems to be a variety, the pods 3 cm. long, 7 mm. broad, aculeate only on the margins. My collections are aberrant, the flowers in short spikes. F.M. Neg. 28209.

Cajamarca: Near Cajamarca, *Bonpland*, type.—Junín: Cabello, *1328*.—Ancash: Chacchan, *2536*.—Libertad: Prov. of Huamachuco, *Weberbauer 7005* (det. Harms, *M. soratensis* affine).—Cuzco: Ollantaytambo, *Weberbauer 5078* (det. Harms); 175. Valle del Urubamba, 2,200 meters, *Herrera 3248; 3226; 2095*. Valle de San Miguel, *Herrera 1983*. Machu-picchu, *Vargas 525*. Bolivia. "Huasango," "michi-ccallo," "algorobo."

Mimosa rufescens Benth. in Mart. Fl. Bras. 15, pt. 2: 362. 1876.

Like *M. micracantha* but reddish puberulent to nearly glabrous, remotely and minutely aculeate, and, especially, the pinnae mostly 4–6 pairs, the leaflets 3–7 pairs, the larger to 2.5 cm. broad, little longer, glabrous or a little pilose in the axils of the veins, the punctae beneath minute; pods 1 dm. long or longer, 12 mm. wide.—F.M. Negs. 28229; 21881 (as *micracantha*).

Loreto: Iquitos, *Tessmann 5033* (det. Harms); *Klug 731; 820* (both det. Killip); *Kuhlmann 17560* (det. Ducke). Brazil; Bolivia. "Pashacillol."

Mimosa sensitiva L. Sp. Pl. 518. 1753; 390.

Sprawling, or more or less scandent, much branched, the branchlets in greater or less degree hirsutulous or puberulent and usually lineately armed with small prickles; stipules lanceolate, rigid, pectinate-ciliate, often 4 mm. long; petioles 2.5–5 cm. long, often densely aculeate, the rachis scarcely more than 1 cm. long, pilose or villous; leaflets 2 pairs, obliquely ovate-lanceolate, acute, the larger usually 3.5–5 cm. long, 2–3 cm. broad, 3–4-nerved, the margin appressed-spinulose-ciliate, appressed-villous both sides or glabrous above; peduncles to 2.5 cm. long, often geminate, the terminal racemose; flowers 4-merous, the calyx fimbriate-setulose at the throat; pods about 2 cm. long, 6 mm. broad, acuminate, abundantly setose, especially at the margins.—Description after Bentham, who remarks that the interpretation of the species could readily include *M. albida* Humb. & Bonpl. and *M. Velloziana* Mart. the latter glabrous, even the branchlets, except sometimes for a few strigose trichomes on the leaflets beneath. All of these forms contract their leaves when touched.

Cajamarca: Cascas, (*Raimondi*, det. Harms). Brazil. "Tapate," "cirrateputa."

Mimosa somnians Humb. & Bonpl. ex Willd. Sp. Pl. 4: 1036. 1806; 434.

Semiherbaceous, the elongate branchlets more or less glandular villous, sometimes glabrate, usually sparsely aculeate; petioles slender; pinnae 2–8 pairs with 12–30 pairs of linear-oblong glabrous leaflets 2–4 mm. long; upper peduncles racemose, to several cm. long; flowers pink, 4-merous, the corolla conspicuously striate; pods 4–7 cm. long, 2–3 mm. wide, glandular or glabrous, more or less stiped, the segments 5–8.—Illustrated, Kunth, Mimoseae, *pl. 7*.

Peru (probably). Bolivia and Paraguay to Venezuela; Colombia; Panama.

Mimosa Tessmannii Harms, Notizbl. Bot. Gart. Berlin 9: 967. 1926.

Scandent, the somewhat velvety-puberulent and angled upper branchlets abundantly armed with stout recurved prickles that

extend also to the petioles and puberulent leaf-rachi which are subglobosely glandular between the 2–3 pairs of pinnae; leaflets 2–4 pairs, shortly petiolulate, obliquely obovate, often more or less rhombic, obtuse or rounded at apex, mucronulate, very minutely puberulent both sides, 3–5 cm. long, 2–4 cm. broad; peduncles 1 cm. long, the densely flowered spikes to 4 cm. long or longer borne in a rather ample puberulent panicle; calyx minutely pubescent as the 5 petals without, the stamens 10.—According to the collector the lower stem sometimes is 5 cm. thick, without spines and contains drinkable water; petals orange-yellow-green. F.M. Neg. 1440.

Loreto: Mouth of Río Santiago, flood-free woods, *Tessmann 4441*, type. "Pachaco."

Mimosa Weberbaueri Harms, Bot. Jahrb. 42: 90. 1909.

Resembles *M. dichoneuta* but the pubescence a little longer, rather villous-puberulent, the pinnae 6–10 pairs, the leaflets glabrous or nearly above; peduncles 1–2 cm. long, terminally panicled; flowers glabrous, 2–2.5 mm. long; pods 3–5 cm. long, 5–8 mm. broad, shortly ashy-villous.—F.M. Neg. 1444.

Amazonas: Near Chachapoyas, 2,400 meters, *Weberbauer 4321*, type.

Mimosa xinguensis Ducke, Archiv. Jard. Bot. Rio Jan. 4: 32. 1925.

Scandent shrub, the somewhat angled branchlets, petioles and panicles densely armed with small retrorse prickles and more or less rusty-puberulent; pinnae 2 pairs, with an elevated gland on the petiole and sometimes 1 or more between the leaflets which are in 2 pairs on the lower pinnae, 3 pairs on the upper, the terminal ones to 6 cm. long, 3.5 cm. broad, the others much smaller, the basal sometimes only 1 cm. broad and little longer, all strongly falcate or oblique or subrhombic, obtuse, lustrous and more or less pilose-puberulent above, more densely so beneath, at least on the prominent nerves, the veins reticulate; inflorescence and flowers of *M. micracantha* but densely prickly.—The related *M. Spruceana* Benth. and *M. annularis* Spruce of northern Brazil are sparsely prickly and have 4–6 pairs of leaflets, those of the latter only to 2.5 cm. long, those of the former softly tomentose-villous beneath and also reddish-punctate. F.M. Neg. 1446.

Loreto: Río Mazán, *José Schunke 46*. Mishuyacu, *Klug 772* (det. Killip). Río Itaya, *Killip & Smith 29409* (det. Killip). Brazil. "Pashaquilla."

10. SCHRANKIA Willd.

Leptoglottis DC.; *Morongia* Britton.

Sprawling sometimes prostrate abundantly aculeate more or less woody or herbaceous plants not separable from *Mimosa* in character except for the narrow terete-tetragonous pods. Flowers in globose heads, usually 5-merous, the stamens twice as many as the petals, these coalescent to the middle, the filaments filiform in hermaphrodite flowers, often complanate in male. Leaves characteristically remotely bipinnate, the petiole eglandular, the sensitive leaflets small.—The name *Schrankia* has been conserved.

Schrankia leptocarpa DC. Prodr. 2: 443. 1825; 441. *Leptoglottis leptocarpa* (DC.) Standl. Journ. Wash. Acad. Sci. 15: 458. 1925.

Aculeate even to the pod-margins, the petioles less so, these to 1 dm. long, the spreading or subscandent stems often several dm. long, glabrous; stipules setaceous, rigid; pinnae 2–3 pairs, 2.5–5 cm. long; leaflets 10–20 pairs, oblong-linear, strongly inequilateral at base, 6–12 mm. long, 2–2.5 mm. broad; peduncles axillary, solitary or binate, 4–10 mm. long, the globose heads without the stamens 4 mm. thick; corolla scarcely 2 mm. long, glabrous, the stamens twice as long; pods 7–10 cm. long, 4 mm. thick, long-beaked, at maturity 4-valvate, 2 of the valves broader; seeds many, obovoid, black, lustrous.—Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 99.*

Loreto: Mishuyacu, near Iquitos, *Klug 1291*. Brazil to Colombia.

11. DESMANTHUS Willd.

Acuan Medic.

Rather similar to *Neptunia* and *Mimosa*, particularly the former, but stems more erect, often woody, stipules setaceous, anthers eglandular and pods linear, normally several in a cluster, the valves not separating from the margins, the seeds oblique or longitudinal in position.—The name of Willdenow has been conserved.

Desmanthus depressus Humb. & Bonpl. in Willd. Sp. Pl. 4: 1046. 1806; 386. *Acuan depressum* (Humb. & Bonpl.) Kuntze, Rev. Gen. 158. 1891.

Glabrate, diffusely branched; pinnae 1–5 pairs, often only 2.5 cm. long with 10–20 pairs of leaflets, usually shorter than 4 mm.; petiolar gland orbicular, small; otherwise like *D. virgatus* to which it probably should be referred as a variety (Bentham). F.M. Neg. 1473.

Libertad: Chicama Valley, *Smyth 47*. Bolivia and Argentina to the West Indies and Central America.

Desmanthus virgatus (L.) Willd. Sp. Pl. 4: 1047. 1806; 385. *Mimosa virgata* L. Sp. Pl. 519. 1753. *Acuan virgatum* (L.) Medic. Theod. Sp. 62. 1786.

More or less ligneous below, the slightly angled and striate erect or suberect stems often several dm. high, sometimes higher, glabrous or early lightly pubescent; pinnae 2–4 (7) pairs, to 4.5 cm. long or longer, the leaflets 4–8.5 mm. long; gland large, cupulate; flowers white, 6–10 in each head, the glabrous corolla 3–4 mm. long, the stamens twice as long; pods erect-spreading, 3.5–8 cm. long, 3–4 mm. wide, the margins thickened, with as many as 20 (or more) obliquely placed seeds.—Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 79;* Degener, Fl. Hawaii.

San Martín: Río Huallaga, *Williams 6215*.—Piura: Nigritos, *Haught 60*.—Lima: Environs Lima, (*Raimondi*). Warm America.

12. LEUCAENA Benth.

Like *Mimosa* but always trees or shrubs and unarmed. Stipules setaceous or small. Flowers in globose heads. Stamens 10. Ovary stiped. Pods broadly linear, firm-membranous, bivalved, continuous within, the seeds transverse, ovate-oblong, compressed, with scanty albumen.—Cf. *Acacia glomerosa*, which simulates this when in fruit.

Leaflets 8–12 mm. long ..... *L. glauca.*

Leaflets larger.

Leaflets soon glabrous..... *L. trichodes.*

Leaflets puberulent beneath..... *L. canescens.*

Leucaena canescens Benth. Pl. Hartw. 117. 1843; 444.

Resembles *L. trichodes* but puberulent-pilose on the peduncles, petioles, leaf-rachi and especially on the leaflets beneath, these membranous, sometimes as many as 6 pairs, in the type only 2–3; peduncles 2–3 cm. long; anthers densely pilose.—As in the related species the rachis glands are elevated and rather conspicuous. F.M. Negs. 28145; 32051.

Tumbez: Near Ricaplaya, deciduous bush-wood, *Weberbauer 7739*. Ecuador.

Leucaena glauca (L.) Benth. in Hook. Journ. Bot. 4: 416. 1842; 443. *Mimosa glauca* L. Sp. Pl. 520. 1753.

Becoming a small tree, the young subterete branchlets, leaves and peduncles minutely tomentulose; petioles 10 cm. long or longer, sometimes with a gland between or below the lowest pinnae, these in 4–8 pairs, 5–10 cm. long; leaflets 10–20 pairs, linear to lanceolate, oblique and strongly inequilateral, 8–12 mm. long, glabrous, membranous, paler beneath; peduncles axillary, 1–3, the upper panicled, the globose heads nearly 2.5 cm. thick with the stamens, these twice as long as the corolla, the petals of this finally parted to base, 2 mm. long and twice as long as the calyx, which is equaled by the ovate bracts; pods 10–15 cm. long or longer, 8–12 mm. broad, shortly stiped, the many seeds oblong.—Cultivated in warm regions for ornament. Illustrated, Sargent, Silva 3: *pl. 139*.

Lima: Chosica, small much-branched tree by fence, *2857*.—Tacna: *Shepard 304*. Warm America.

Leucaena trichodes (Jacq.) Benth. in Hook. Journ. Bot. 4: 417. 1842; 444. *Mimosa trichodes* Jacq. Hort. Schoenbr. 3: 76. *pl. 394*. 1798.

Glabrate shrub, the minute puberulence evanescent; petioles slender with 2–3 rather remote pairs of divaricate ascending pinnae, the leaflets 2–5 pairs somewhat obliquely ovate, rounded or acute at base, apiculate and usually obliquely rounded at apex or sometimes acute, ordinarily 2–3 cm. long, about half as broad, subcoriaceous; peduncles fascicled in the axils, 1–2 cm. long, the flower-heads scarcely 1 cm. thick; anthers with a few long crisp trichomes; pods membranous, 10 cm. long or longer, about 2 cm. broad, lustrous, glabrous.—*Haught F119* was referred here by Harms without question but Rose wrote the collector that it was a new species. As the only difference seems to be the acute or acuminate leaflets it may become var. **acutifolia** Macbr., var. nov., foliolis acutis vel interdum acuminatis. Besides the collections cited Bentham noted without locality, *Mathews 476, Cuming 985*.

Ruiz & Pavón were told, as they noted in their journal, that the animal eating this plant loses the hair of the mane and tail and that any person may become bald by washing his hair several times with water in which the leaves have been bruised. Nevertheless, according to the observation of Mrs. Mexia, the foliage is fed to stock. F.M. Neg. 32049.

Piura: Pariñas Valley, *Haught F119*, type, var., (Weberbauer, 150). Río Quiroz, (*Raimondi*).—Cajamarca: Nanchoc, (*Raimondi*). —Lima: Chancay, *Ruiz & Pavón*.—Huánuco: Marañón Valley, (Weberbauer, 155).—Apurímac: Río Pachachaca, dry shrub-land, *Goodspeed 10522* (det. Standl., *L. canescens*).—Libertad: Tayabamba, (*Raimondi*). Locality unknown, *Weberbauer 5876*.—Cuzco: Río Vilcanota, *Mexia 8024* (det. Killip). To Venezuela and Central America. "Chamba," "yerba de la lancha."

13. PIPTADENIA Benth.

Reference: Trans. Linn. Soc. 30: 366–373. 1875.

Shrubs or trees sometimes prickly with bipinnate leaves, the leaflets most often opposite, small, numerous, and the main rachis characteristically glandular at the base of the pinnae. Flowers 5-merous, small, in axillary cylindrical spikes or heads frequently panicled. Calyx campanulate, minutely dentate. Petals usually nearly free but sometimes connate to the middle, valvate. Stamens 10, free, exserted, usually deciduously glandular. Pods rarely sessile, broadly linear, plane or subcoriaceous, 2-valved, continuous within, the seeds exalbuminous.—*P. colubrina* and *P. grata* approach *Leucaena* but in the pods and large compressed exalbuminous seeds they are characteristically *Piptadenia*.

Called "Yopo" tree—the "beans" are ground to powder and inhaled for intoxication; cf. *P. colubrina*.

Leaflets 10 mm. long or longer; ovary villous..... *P. adiantoides*.

Leaflets much smaller, many.

Leaflets usually 3–several mm. long, at least the midnerve obvious; flowers in cylindrical spikes.

Leaflets glabrous or merely pubescent at base on nerve.

Ovary glabrous; pinnae usually many; leaflets membranous.

Pinnae mostly fewer than 10 pairs; calyx glabrous.

Pod valves membranous, raised above the seeds; leaflets dull..... *P. flava*.

Pod valves subcoriaceous, the seeds scarcely obvious; leaflets lustrous..... *P. communis*.

Pinnae mostly more than 10 pairs; calyx usually pubescent. *P. pteroclada*.

Ovary villous; pinnae 3–6 pairs; leaflets firm.. *P. Weberbaueri*.

Leaflets puberulent, at least beneath.

Ovary villous; leaflets about 6 mm. long.....*P. Killipii.*
Ovary glabrous; leaflets about 3 mm. long.....*P. viridiflora.*
Leaflets about 2 mm. long or smaller, the nerve obscure; flowers in globose heads.
Heads mostly paniculate.....*P. colubrina.*
Heads axillary or racemose.....*P. grata.*

Piptadenia adiantoides (Spreng.) Macbr. Contr. Gray Herb. 49: 17. 1919; 367. *Acacia adiantoides* Spreng. Syst. 3: 146. 1826. *P. laxa* Benth. in Hook. Journ. Bot. 4: 335. 1842.

Glabrous or typically somewhat puberulent with a few small recurved prickles on the long branches and leaf-rachi; petiolar gland oblong; pinnae 2–4 pairs with 4–7 pairs of obliquely ovate or obovate-elliptic leaflets, these usually about 2 cm. long, half as wide or in the Peruvian variety much larger; spikes slender, 5–10 cm. long, solitary or fasciculate in the upper axils or in leafless panicles, 2–3 dm. long; flowers usually glabrous, scarcely 2 mm. long, not including the twice as long stamens; calyx about a fourth as long as the corolla; ovary stipitate, more or less villous; pods straight, firm-membranous, 1 dm. long or longer, about 2 cm. wide.—Liana or shrub with the upper branches more or less scandent. The Peruvian plant seems to be the same except for the much larger leaflets and may be noted as var. **peruviana** Macbr., var. nov., foliolis ad 5 cm. longis, 3 cm. latis, apice obtusis vel obscure breviterque acuminulatis (*Klug 4018*, type). *P. uaupensis* Spruce, 273, of northern Brazil, has a globose petiolar gland, 2 pairs of pinnae, 2–3 pairs of obovate leaflets, to 5 cm. long; *P. Poeppigii* Klotzsch ex Benth., 274, Amazonian, has even larger obtusely acuminate leaflets and according to Ducke is *Stryphonodendron paniculatum* Poepp. & Endl. Illustrated, Mart. Fl. Bras. 15, pt. 2. *pl. 72.*

San Martín: Chazuta, *Klug 4018*, var.—Loreto: Yurimaguas, (*Poeppig*, det. Benth. with query). Balsapuerto, *Klug 2927.* Brazil.

Piptadenia colubrina (Vell.) Benth. in Hook. Journ. Bot. 4: 341. 1842; 372. *Mimosa colubrina* Vell. Fl. Flum. Ic. 11. *pl. 16.* 1827, Text, ed. Netto, 434. 1881.

Smooth and glabrous tree or the young parts minutely puberulent, leaves with 15–20 pairs of pinnae, the many linear leaflets 3–4 mm. long, rather lustrous; peduncles fasciculate at the tips of the branch-

lets, racemose and paniculate, few axillary, the heads globose, scarcely 5 mm. in diameter without the stamens; anthers glandular in bud; pods to 2.5 dm. long, 1.5 cm. wide or somewhat wider, plane, coriaceous, more or less regularly constricted between the seeds.—Cf. *P. grata* which certainly is very closely related if indeed its character should not be broadened to include *P. colubrina* as a more southern-ranging variety; it seems probable that the Peruvian specimens referred here by Bentham are rather *P. grata*. *P. peregrina* (L.) Benth., to be expected, has peduncles mostly axillary, anthers eglandular. Attains 30 meters. The bark is said to be astringent. The seeds of both species, finely ground, are used as snuff and are highly narcotic; cf. Safford, Ann. Report Smiths. Inst. 393–397. 1917, and Herrera says that the wood is much appreciated for fine canes. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 76*.

Cajamarca: Chota, (*Bonpland*).—Huánuco: (*Mathews 907*). Brazil; Bolivia. "Angico," "vilca," "huillca," "willca" (Safford), "parica."

Piptadenia communis Benth. in Hook. Journ. Bot. 4: 337. 1842; 370.

Becoming a tree, the younger branchlets more or less 4–5 wing-angled (or sometimes merely striate), the angles sparsely to densely aculeate, the small prickles straight or incurved; petioles with 1 scutellate or verruciform gland near the base; pinnae 2.5–7 cm. long, glabrate, 5–12 pairs, the 30–50 pairs of falcate-linear leaflets obtusely mucronulate, oblique at base, 4–6 (8) mm. long, the midnerve excentric; spikes axillary and racemose, densely flowered, about 6 cm. long, the rachis puberulent, the minute bracts persisting; calyx minute, scarcely one-fourth as long as the glabrous petals, these nearly 2 mm. long, reddish in age; ovary glabrous, stipitate; pods plane, obscurely but rather coarsely reticulate-veined, coriaceous, to about 10 cm. long, 2–2.5 cm. wide, the position of the seeds scarcely if at all obvious.—Sometimes attains 15 meters, the wood used for posts and beams (Mexia). This is *P. gonoacantha* (Mart.) Macbr. Contr. Gray Herb. 49: 17. 1919, which name however is not employed here because of the possibility that *Acacia callosa* Spreng., Syst. 3: 138. 1826, may actually prove to be the same species and in this case the earliest cognomen. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 74* (except probably the pods).

Río Acre: Seringal San Francisco, *Ule 9433* (det. Harms). To southern Brazil.

Piptadenia flava (Spreng.) Benth. Trans. Linn. Soc. 30: 371. 1875. *Acacia flava* Spreng. ex DC. Prodr. 2: 469. 1825.

Much like *P. communis* but in general the branchlets slenderer terete or slightly striate, the prickles sometimes stouter and, especially, the leaflets thinner not at all lustrous and usually drying pale yellowish-green; pinnae 6–10 pairs; leaflets 4–8 mm. long, obscurely if at all puberulent, the midnerve little excentric; petals 1.5–2 mm. long, the calyx one-third to one-half as long; ovary glabrous; pods obviously membranous, obscurely and finely veiny, lustrous, to 8 cm. long, 1.5 cm. broad, the surfaces irregular by the maturing seeds. —F.M. Neg. 1477.

Tumbez: Prov. Paita, *Haught 105*. Hacienda la Choza, *Weberbauer 7689*.—San Martín: Chazuta, *Klug 4022* (det. Standl.).—Ayacucho: Estrella, *Killip & Smith 23091* (perhaps; sterile). To Colombia and Trinidad. "Uña-de-gato."

Piptadenia grata (Willd.) Macbr. Contr. Gray Herb. 49: 17. 1919; 372. *Acacia grata* Willd. Enum. Hort. Berol. 1056. 1809. *P. macrocarpa* Benth. in Hook. Journ. Bot. 4: 341. 1842.

Similar to *P. colubrina* but the peduncles all or nearly all fascicled in the axils, the coriaceous pods often somewhat curved, usually slightly if at all or irregularly contracted between the seeds.—The gray bark on the older branches is often nodulosely rugulose. The anthers as in the related species are glanduliferous. F.M. Neg. 32023.

Huánuco: Near Ambo, along river, *1353; 2421; 3199*. Near Huánuco, *Ruiz & Pavón; Weberbauer 6686*.—Huancavelica: Valley of the Mantaro, *Weberbauer 6505*.—Apurímac: River terraces, 2,000 meters, *West 3845* (det. Johnst.). Scattered in stands of *Acacia macracantha, West 3679* (det. Johnst.).—Cuzco: Valle del Urubamba, *Herrera 3210*. To Brazil and Argentina. "Algarrobo," "vilca."

Piptadenia Killipii Macbr., spec. nov.

Frutex scandens, ramulis novellis dense puberulis et ad angulos etiam foliorum petiolis (cum rhachidibus) minute et dissite aculeatis; pinnis 8–9 jugis, glandula elevata verrucaeformis prope basin petioli, minor inter pinnas supremas; foliolis circa 8–15 jugis utrinque puberulis oblongis vix acutis 6 mm. longis, 2 mm. latis, costa subcentrali, venulis fere obsoletis; spicis axillaribus, breviter pedunculatis, 3.5 cm. longis, densifloris; floribus flavescentibus praeter calycibus (puberulis, minutis) glabris 2 mm. longis;

ovario stipitato villoso.—Distributed as *P. flava* but obviously on account of the densely villous ovary not related; it may bear the name of my well-known friend who verified my observations that the plant was misdetermined.

San Martín: Juanjuí, *Klug 4333*, type.—Junín: Puerto Bermúdez, *Killip & Smith 26406*.

Piptadenia pteroclada Benth. Trans. Linn. Soc. 30: 370. 1875. *P. opacifolia* Ducke, Archiv. Jard. Bot. Rio Jan. 5: 125. 1930.

Tree, sometimes 25 meters high, typically unarmed or the prickles remote, glabrous except the spikes, these often 1 dm. long or longer, and the slender leaf-rachi (or these glabrate); petiolar gland more or less elevated, sometimes obscure; pinnae 12–18 pairs, with often more than 50 pairs of linear, somewhat falcate obtuse or obscurely cusped leaflets, these usually opaque above or in age slightly lustrous, paler beneath, usually 6–8 mm. long, the midnerve little excentric; calyx minute, puberulent, the glabrous petals 2–2.5 mm. long; ovary glabrous.—Ducke describes the pods of his species as similar to those of *P. communis*, the flowers, at first greenish-white, finally purplish. The Peruvian collectors noted the flowers as rose-colored or wine-red and the Ducke specimens have 5–14 pairs of pinnae but these variations are scarcely specific. *Klug 4386*, proposed by Standley in herb. as a new species may become var. **Klugii** Macbr., var. nov., foliolis ad 10 mm. longis; floribus glabris. F.M. Neg. 1486.

San Martín: Tarapoto, *Spruce 4536*. Juanjuí, *Klug 4386* (type, var. *Klugii*).—Loreto: Florida, *Klug 2034* (det. Standl., *P. flava*). Río Itaya, *Williams 3311* (det. Standl., *P. flava*). Río Nanay, *Williams 514* (det. Standl., *P. flava*). Pebas, (*Ducke*, type, *P. opacifolia*). Chimbote, (*Kuhlmann*). Brazil. "Pashaco," "pashaguillo."

Piptadenia viridiflora (Kunth) Benth. in Hook. Journ. Bot. 4: 337. 1842; 369. *Acacia viridiflora* Kunth, Mimoseae 81. *pl. 25*. 1820.

A small somewhat prickly tree, or the younger ashy-puberulent branchlets unarmed; pinnae 6–10 (15) pairs; leaflets 15–35 pairs, about 3 mm. long, somewhat falcate, obtuse, obsoletely veined except the prominent midnerve beneath, membranous, glabrous above, paler and puberulent beneath; spikes axillary, solitary, the rachis ashy-puberulent; calyx minute, glabrous, much shorter than the greenish petals; anthers glandular; ovary stipitate, glabrous.—

There are usually 2 or 3 glands on the leaf-rachis as well as 1 on the petiole. According to Bentham this is the same as *P. subtilifolia* (HBK.) Benth. of Ecuador; both species are characterized by the petals being somewhat united above the base; the earlier name is that of Kunth. *P. boliviana* Benth., 370, is tomentulose, the petals less than twice as long as the corolla, the stamens only shortly exserted. Illustrated, Kunth, Mimoseae, *pl. 25*.

Cajamarca: San Felipe, (*Bonpland*, type).

Piptadenia Weberbaueri Harms, Repert. Sp. Nov. 18: 234. 1922.

Tree with short stocky branchlets, these as the leaves glabrous or evanescently puberulent; petiolar gland small, patelliform; pinnae 4–6 pairs, 4–6 cm. long; leaflets 25–40 pairs, slightly falcate, obliquely oblong, obtuse, 3–5 mm. long, somewhat lustrous, the midnerve beneath obviously excentric; spikes axillary, solitary, 2–3 cm. long, compactly flowered; bracts minute, dilated at tip, pilose, persisting; calyx scarcely longer than 1 mm., puberulent, the glabrous petals about twice as long, the anthers deciduously glandular; ovary stipitate, hirsute.—The leaflets are a little narrowed toward the tip and thus are rather lanceolate, sometimes acutish. *P. psilostachya* (DC.) Benth., 372, would be sought here and according to Ducke has been found as near as São Paulo de Olivença; it has 7–10 pairs of pinnae, leaflets obtuse, 8 mm. long, 3 mm. wide and slender spikes of ashy-pubescent flowers. F.M. Neg. 1490.

Libertad: Above La Vina, 2,000 meters, *Weberbauer 7212*, type.

14. STRYPHNODENDRON Mart.

Characters in general those of *Piptadenia* but plants always unarmed, often more distinctly pubescent, the leaflets usually alternate and the branchlets stouter. Spikes cylindrical, the anthers glandular. Pods turgid, more or less divided between the albuminous seeds.—The leaflets are larger in the Peruvian species than in *Piptadenia* except *P. adiantoides* with prickly stems. Cf. *Dinizia* Ducke, noted under *Dimorphandra*.

Leaflets 12–17 mm. long; flowers glabrous. . . . . *S. purpureum*.

Leaflets 4–10 mm. long; flowers puberulent. . . . . *S. pulcherrimum*.

Stryphnodendron pulcherrimum (Willd.) Hochr. Bull. N. Y. Bot. Gard. 6: 274. 1910. *Acacia pulcherrima* Willd. Sp. Pl. 4: 1061.

1806. *S. floribundum* Benth. in Hook. Journ. Bot. 4: 343. 1842. *S. guianense* Benth. forma *floribundum* (Benth.) Ducke, Archiv. Jard. Bot. Rio Jan. 4: 250. 1925.

Tree, the rather stout somewhat angled branchlets evanescently reddish-tomentose-puberulent; pinnae 12–15 pairs; leaflets 10–20 pairs, obliquely oblong, sparsely puberulent especially beneath or distinctly paler, 4–6 mm. long, half as broad; spikes slender, often 10 cm. long, the rachis puberulent as also the flowers, these scarcely 2 mm. long; pods straight or slightly curved, subterete to 1 dm. long, 8 mm. thick.—Ducke may be correct in regarding this as merely a form of the Guiana tree but that species at least as to type has glabrous flowers, leaflets 8–10 mm. long; in view of similar distinctions used to separate other species and those in the related if indeed distinct genus *Piptadenia*, these characters seem to be specifically diagnostic. Both species are very near *S. polyphyllum* Mart., 374, with glabrous flowers but the corolla more than three times longer than the calyx, the pinnae 15–20 pairs, leaflets 10–20 pairs, 6–8 mm. long. F.M. Neg. 1471.

Río Acre: Mouth of Río Macauhán, 25 meters high on terra firma, *Krukoff 5426* (distr. as *S. polyphyllum*, affine). Brazil; British Guiana.

Stryphnodendron purpureum Ducke, Archiv. Jard. Bot. Rio Jan. 1: 16. 1915.

Branchlets stout, abundantly white-lenticellate and densely red-tomentulose, the indument short, extending also more or less to the leaf-rachi and short peduncles of the mostly geminate axillary spikes; pinnae usually 9 pairs; leaflets 10–18 pairs, nearly half as broad as long, the ultimate obovate, the others rhombic-oblong, very oblique at the subtruncate base, obtuse or usually emarginate, glabrous and lustrous above, paler, opaque and minutely puberulent-pilose beneath, the midnerve excentric; flowers glabrous, purple, the calyx less than 1 mm. the corolla slightly more than 1 mm. long; pods falcate to 14 cm. long, 12 mm. wide, rusty-brown-tomentose.—The petiolar gland is large. F.M. Neg. 28299.

Loreto: Iquitos, *Ducke 20182*. Mishuyacu, *Klug 47*. Brazil to the Guianas.

15. ENTADA Adans.

Smooth or finely aculeate trees or high-climbing shrubs with bipinnate leaves the terminal pair of pinnae sometimes modified

into tendrils. Flowers almost minute, 5-merous, borne in solitary or panicled slender densely crowded spikes. Calyx campanulate. Petals white, free or nearly. Stamens 10, free, shortly exserted; anthers before anthesis glandular. Ovary sessile, many-ovuled, the short style with truncate terminal stigma. Pods plano-compressed, various in texture, the thickened sutures persisting, the inner part breaking into 1-seeded joints.

Entada polyphylla Benth. in Hook. Journ. Bot. 2: 133. 1840; 365. *Entadopsis polyphylla* (Benth.) Britton, N. Amer. Fl. 23, pt. 3: 191. 1928.

More or less minutely puberulent; leaves with 4–8 pairs of pinnae, 10–20 pairs of oblong, obtuse or emarginate leaflets, 8–16 mm. long, about 4 mm. wide, oblique at the inequilateral base; inflorescence to several dm. long, the yellowish flowers crowded, scarcely 2 mm. long, the minute calyx 5-toothed, the petals oblong, well exceeded by the whitish stamens; pods to 3 dm. long, papery between the margins, 5–7 cm. wide.—Slender tree sometimes scandent with coarsely fissured bark which yields a slightly sweet pale yellow resin that is sometimes used for dyeing leather black (Williams).

San Martín: Tarapoto, *Williams 5475; 5576* (as to fruit); *6689.*—Loreto: Yurimaguas, *Killip & Smith 29116; Williams 4009* (as to fruit); *Williams 4544.* Near Iquitos, *Klug 290; Killip & Smith 27176.* Balsapuerto, *Klug 2850.* Río Itaya, *Williams 185.* Brazil; Guiana. "Pashaco."

Entada polystachya (L.) DC. Mém. Leg. 434. *pls. 61, 62.* 1825. *Mimosa polystachya* (L.) Sp. Pl. 520. 1753. *Entadopsis polystachya* (L.) Britton, N. Amer. Fl. 23, pt. 3: 190. 1928.

High climbing liana, the petioles sometimes cirrose, pinnae 2–6 pairs; leaflets 6–8 pairs, oblong, obtuse or emarginate, usually 2–3.5 cm. long, 12–18 mm. broad, somewhat puberulent-pilose, especially on the midnerve beneath; spikes short, very many, densely crowded in a long raceme; pods similar to those of *E. polyphylla.*

Peru: (fide Ducke). To Trinidad, the West Indies and Mexico.

16. NEPTUNIA Lour.

Diffuse or prostrate (one species aquatic) perennial herb, sometimes suffrutescent at base, or rarely low undershrubs. Leaves bipinnate, the leaflets small, stipules often well-developed, membranous, obliquely cordate or minute. Flowers sessile in ovoid or globose

heads on axillary solitary peduncles, the lower flowers sometimes neuter. Stamens 10 (5), exserted, the neuter flowers with 10 petaloid staminodes; anthers glandular. Calyx white. Ovary stipitate, many-ovuled. Pods obliquely oblong, plano-compressed, firm-membranous, 2-valved, subseptate between the transverse ovate seeds, usually several in a cluster.

Neptunia prostrata (Lam.) Baillon in Bull. Soc. Linn. Paris 1: 356. 1883. *Mimosa prostrata* Lam. Encycl. 1: 10. 1783. *N. oleracea* Lour. Fl. Cochinch. 634. 1790. *M. natans* L. f. Suppl. 439. 1781 as to name and specimen cited, not as to description; cf. Macbride, Contr. Gray Herb. 59: 15. 1919.

Glabrous, often aquatic, the spongy rhizome when floating supporting at the surface from swollen stems (1–2 cm. thick) the divided leaves, these with eglandular petioles, 2–3 pairs of pinnae and 8–12 pairs of nearly linear leaflets commonly 6–12 mm. long, the rachis tipped with a bristle; stipules broad, 5–7 mm. long; peduncles several to many cm. long in fruit; perfect flowers white, the petals 4 mm. long; pods 2–2.5 cm. long, 8–10 mm. wide, mucronate, more or less recurving on the stipe, the seeds 5–8.—*N. plena* (L.) Benth., 291, is a smooth herb less or never aquatic, the petiole with a gland, the leaves with 3–5 pairs of pinnae, the pods to 4 cm. long, 1 cm. wide, with many (to 20) seeds. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 78.*

Peru (probably). Warm regions.

Neptunia pubescens Benth. in Hook. Journ. Bot. 4: 356. 1842; 384.

Prostrate or prostrate-ascending half-shrub, the slender elongating branches lightly appressed-pubescent; stipules several mm. long, ovate, aristate-acuminate, striate; pinnae 2–4 pairs, the glands obscure or none; leaflets 20–30 pairs, crowded, linear, 2–4 mm. long, ciliate; peduncles to 3 cm. long, the flower-heads scarcely 5 mm. thick, the lower flowers few, male; pods about 2 cm. long, half as broad, the stipe scarcely more than 2 mm. long.

Lima: Huara, *Ruiz & Pavón; Dombey.* Near Lima, *Cuming 1027*, type. West Indies; Florida to Texas and south to Paraguay.

17. PROSOPIS L.

Reference: Burkart, Darwiniana 4: 57–128. 1940.

Shrubs or trees, characteristically nodosely armed, the bipinnate often glaucous leaves usually with only 1 or 2 pairs of pinnae, these

in turn with rather few, and rigid, leaflets. Glands small, obscure or wanting. Flowers small, ordinarily in cylindrical spikes on axillary peduncles. Stamens 10, free, shortly exserted, usually, but deciduously, glandular. Pods linear, distinctly or little compressed, even subterete, straight, falcate or contracted, various in texture, the compressed albuminous seeds commonly separated by more or less continuous or permanent tissue, segments of pods nut-like by the ligneous or nearly bony endocarp. Burkart has shown, l.c. 72, that *P. strombulifera* (Lam.) Benth. must have been by error accredited to Peru by Lamarck.

Leaflets 16–25 pairs; spikes overtopped by the leaves. . . *P. chilensis.*
Leaflets 6–12 pairs; spikes longer than leaves. . . . . *P. limensis.*

Prosopis chilensis (Molina) Stuntz, U. S. Bur. Pl. Ind. 31: 85. 1914; 105. *Ceratonia chilensis* Molina, Sagg. Nat. Chil. 172. 1782. *P. juliflora* of authors as to Peru, not (Sw.) DC.

Tall shrub to slender tree commonly only several meters high, the glaucous openly divided leaves glabrous or minutely puberulent, the axillary spines (sometimes wanting) solitary or geminate, short or on sterile shoots to 5 cm. long, the cylindrical spikes axillary or fasciculate with the leaves, subsessile, the yellow pods somewhat arcuate at maturity, 5–15 cm. long, 6–12 mm. broad, the position of the seeds more or less marked without; pinnae 1–2 (3) pairs; leaflets usually 16–25 pairs, rather distantly borne, oblong or linear, 4–16 (35) mm. long, ordinarily about 2 mm. wide, straight or falcate, obtuse or acutish; flowers glabrous without or with a few soft trichomes, 3 mm. long, the petals often lanate within apically; stamens about half again as long as the corolla; ovary shortly stipitate, villous.

"Algarroba," the sweetish edible pulp of the pods, is especially valuable as a food for stock and the hard wood is used to make charcoal. According to Herrera it also furnishes a substitute for gum arabic, while Raimondi found it being used at Arequipa under the name of "yara" for earache in children. He collected it, according to determinations at Dahlem, in the Departments of Piura, Ancash, Lambayeque and Tacna. Cf. also Weberbauer 92, 116, 123.

Piura: Nigritos, *Haught F72,* (Weberbauer, 150, 151, 154).—Arequipa: Tiabaya, *Pennell 13062.* Sandy flat near Arequipa, *Eyerdam & Beetle 22146.*—Cuzco: Valley of the Río Villcanoto, *Mexia 8026* (det. Killip). Calca, *Vargas 709.* Santa Ana, *Cook & Gilbert 1421.* To Chile and Argentina. "Thacco," "guarango," "garroba," "huaranca," "algarroba."

Prosopis limensis Benth. in Hook. Journ. Bot. 4: 350. 1842; 114.

Becoming a tree, the spreading branches and leaves more or less pubescent; pinnae 1–3 pairs, 1.5–3 cm. long, with 6–12 pairs of crowded at least ciliate elliptic-oblong leaflets, 2.5–6.5 mm. long, 1–2.5 mm. broad; racemes well exceeding the leaves, spike-like, the rachis and short peduncles pubescent, 8–13 cm. long, about 9 mm. thick before anthesis; flowers glabrous except for the ciliolate calyx; pods straight, 6–7 cm. long, 12 mm. thick, little compressed.—Stork & Horton noted groves of these trees, some individuals to 16 meters high; cf. also Weberbauer, 92.

Piura: Paita, *Horton 11587; (Ball)*; Weberbauer, 154.—Ancash: Yautan, gravelly river-valley floor, *2563*.—Libertad: Chepén, *Stork & Horton 10012*.—Lima: Near Lima, (*Cuming 974*, type).—Apurímac: *Weberbauer 5366; 5901*. "Algarroba."

18. PARKIA R. Br.

Reference: Ducke, Archiv. Inst. Biol. Veg. Rio Jan. 4: 8–11. 1938.

Smooth trees with large firm bipinnate leaves these with several pinnae and many leaflets, the petiole with a gland. Flowers small, all bisexual or some in each head-like (globose or clavate) inflorescence female or neuter, the 10 stamens accompanied by long staminodes. Calyx lobes imbricate. Pods large, bivalvate, the seeds in 1 or 2 rows and without albumen.—The following key, in part, is after Ducke, the descriptions, in part, after Bentham.

Pentaclethra macroloba (Willd.) Kuntze (*P. filamentosa* Benth.), 262, Brazil to Central America but not yet found in Peru, is similar but has flowers in elongate spikes, the fertile stamens only 5.

Heads globose or depressed-spheroid, all the flowers hermaphrodite or the lower male.

Flowers white; leaflets 2 mm. wide; pods glabrous. . . *P. multijuga*.

Flowers deep red; leaflets 1 mm. wide; pods velutinous. *P. velutina*.

Heads biglobular or clavate, the lower part sterile.

Leaves opposite; flowers white or pale yellow or the lower sterile red.

Leaflets 5–7 mm. wide; heads in flower clavate, the lower part narrower than upper. . . . . *P. decussata*.

Leaflets 2–3 mm. wide; heads in flower biglobose, the lower part wider than the upper. . . . . *P. oppositifolia*.

Leaves alternate; flowers bright or deep colors. . . . . *P. igneiflora*.

Parkia decussata Ducke, Notizbl. Bot. Gart. Berlin 11: 472. 1932.

Large tree with opposite glabrous leaves these with 4–7 pairs of pinnae; leaflets 20–34 pairs, subsigmoid-falcate, oblong, auricled lower side at base, obtuse, 2–3 cm. long, 5–7 mm. wide, nearly concolor, slightly lustrous, 3-nerved; peduncles terminal-erect, stout, to 2 dm. long, densely reddish-tomentulose; heads clavate, to 7 cm. long, the lower reddish sterile portion 2.5 cm. thick, the upper yellowish part about twice as thick; bractlets brown sericeous to base; rachis little enlarged above base, the apical third subglobose-obovoid dilated; pods about 3 dm. long, 4–6 cm. wide, coriaceous, red-tomentose, the tomentum deciduous in age.—Species unique in shape of the flowering heads. Found at Tabatinga (near the boundary), according to Ducke.

Peru (undoubtedly). Amazonian Brazil.

Parkia igneiflora Ducke, Notizbl. Bot. Gart. Berlin 11: 472. 1932.

Tree of medium size, rarely tall but slender with narrow crown that is topped by the extremely long more or less erect inflorescences, the flower-heads to 7 cm. long, the staminodes red-orange, deep red or a beautiful yellow; leaves alternate; pinnae 4–7 pairs; leaflets similar to those of *P. decussata* but 16–29 pairs, 2.5–4 cm. long, 6–10 mm. broad, lighter beneath; sterile part of heads 5–6 cm. thick, the fertile portion half as thick; pods subligneous-coriaceous, 6–9 cm. long, about 4 cm. wide, glabrous.—Description after Ducke who has noted, Archiv. Inst. Biol. Veg. Rio Jan. 4: 8. 1938, formas *purpurea* Ducke and *aurea* Ducke, staminodes purple and yellow, the last also designated, l.c., var. *aurea* Ducke and f. *aureiflora* Ducke, Leg. Amaz. Bras. (Minist. Agric. Serv. Florest.) 47. 1939. Similar are *P. auriculata* Spruce and *P. discolor* Spruce, the latter with 3–4 pairs of pinnae, both small trees with deep purple-red flowers, leaflets rarely 2 cm. long, shorter and harder, slightly spongy pods. Harms referred *Klug 896*, "a tree 16 meters with red and yellow flowers, the fruit edible," to *P. auriculata* but because of color of flowers and size of leaflets (2.5 cm. long, 6 mm. wide) as well as from a standpoint of range it is probably *P. igneiflora* or a variety. *P. pectinata* (H. & B.) Benth., possibly to be expected, has 9–15 pairs of pinnae, the linear leaflets 1-nerved.

Loreto: Mishuyacu, *Klug 896*. Caballo-Cocha, *Williams 2210* (leaf). Amazonian Brazil. "Goma guayo."

Parkia multijuga Benth. in Mart. Fl. Bras. 15, pt. 2: 265. 1876. *Dimorphandra megacarpa* Rolfe, fide Ducke, apparently a herbarium name.

Leaves alternate, large (5 dm. long or longer), the rather short (about 1 dm. long) petiole as well as usually the rachi more or less rufous puberulent; pinnae 20–30 pairs, 1–2 dm. long with 50–100 leaflets, mostly 8–9 mm. long, 2.5 mm. broad, obtuse, slightly auricled at base, subfalcate, 1-nerved, lightly venose, at least beneath where paler; erect peduncles in terminal panicles only 2.5–3.5 cm. long; bracts below the globose heads often foliaceous; pods completely ligneous, 2–3 dm. long, 7–9 cm. broad, 1.5–3 cm. thick (Ducke), used in making soap (Krukoff).—To 45 meters with high buttresses (Krukoff); trunk diameter nearly 3 meters (Poeppig) the wood medium hard but difficult to split (Ducke). *P. Ulei* (Harms) Kuhlm. has much-branched panicles, pinnae about 12–20 pairs, 30–60 pairs of leaflets and persistently tomentose pods to 3 dm. long, 3.5–4.5 cm. wide. *P. pendula* (Willd.) Benth. has depressed sphaeroid heads, suspended on extremely long filiform peduncles, all flowers hermaphrodite but the lower with long filaments, the anthers caducous. Illustrated, flowers and fruit, Archiv. Jard. Bot. Rio Jan. 4: *pl. 1*. F.M. Neg. 32020.

Loreto: Río Marañón, *Tessmann 4392*.—Río Acre: Río Macauhán, *Krukoff 5579*. Brazil; Colombia.

Parkia oppositifolia Spruce ex Benth. in Mart. Fl. Bras. 15, pt. 2: 267. 1876.

Leaves and peduncles opposite, each about 1.5 dm. long, the former with 3–7 pairs of pinnae 1 dm. long or longer; leaflets many, oblong-linear, auricled at base, sometimes with marginal nerve, dull above, paler beneath, nearly straight, 8–12 mm. long, 2–3 mm. wide; heads biglobular, oblong-clavate in age to 5 cm. long; pods about 2 dm. long, 3.5–4 cm. broad, curved on the stipe to 5 cm. long, glabrate in age, the oblong seed not compressed.—Large tree, the inner wood when freshly exposed with a strong odor of methyl-salicylate (Ducke). This is lacking in the related *P. nitida* Benth. and apparently also in *P. inundabilis* Ducke, l.c. 7. Both species lack the wax that is on the reverse side of the leaflets of *P. oppositifolia* and the latter has 8–13 pairs of pinnae. Illustrated, Mart. Fl. Bras. l.c. *pl. 69*.

Loreto: Rio Marañón, *Tessmann 4929*. To British Guiana.

Parkia velutina Benoist, Notul. Syst. 3: 271. 1916.

Characters of *P. multijuga* but the peduncles and leaf-rachi red velvety tomentulose, heads in lateral racemes borne immediately below the leaves which are crowded at the ends of very thick branches and pods to 4 dm. long, 6 cm. wide, coriaceous, brownish-red tomentose (Ducke).—The Klug specimen, only a leaf and broken heads, is determined by Standley with query but seems referable here. It came from a 25-meter tree, the flowers garnet. The species, fide Ducke, grows on non-inundated terrain.

Loreto: Florida, *Klug 2308*. To French Guiana.

CAESALPINIEAE

Key adapted from Bentham by tribes. See alternate key in which *Krameria* is included for convenience but the description for this aberrant group is at the end of the family.

Leaves all or some of them bipinnate.

Sepals connate; flowers regular, small, in dense spikes. *Dimorphandreae.*

Sepals free; flowers more or less irregular..... *Eucaesalpinieae.*

Leaves simple or pinnate, sometimes 1–3 foliate.

Calyx entire in bud.

Leaves simple, bilobed or rarely bifoliate; calyx gamosepalous or valvately parted or spathaceous..... *Bauhinieae.*

Leaves 1–many foliate; calyx cyathiform or ruptured. *Swartzieae.*

Calyx lobes free (except *Poeppigia* in *Sclerolobieae*).

Ovary stipe adnate..... *Amherstieae.*

Ovary or stipe free unless in *Cynometra*.

Anthers 2-pored or shortly 2-cleft or if longitudinally dehiscent, erect and basifixed, not versatile..... *Cassieae.*

Anthers versatile or not as above.

Ovules 3–many; leaves rarely abruptly pinnate. *Sclerolobieae.*

Ovules 1–2; leaves abruptly pinnate, the leaflets 2 or more. *Cynometreae.*

Dimorphandreae

One genus in Peru..... 1. *Dimorphandra.*

Cynometreae

Leaves abruptly pinnate, 2–many foliate; calyx segments free, imbricate or valvate; petals 5 or fewer or none; anthers versatile; ovary 1–2-ovuled.

Petals none; pods obliquely elliptic or falcate-ovate . . 2. *Copaifera.*

Petals 5; pods rather ovoid . . . . . 3. *Cynometra.*

Amherstieae

Leaves usually abruptly pinnate, rarely 1-foliate; calyx segments free, rarely valvate; petals none–5; anthers versatile; ovary stipe adnate; ovules 3–many.

Bractlets small or promptly caducous (cf. *Brownea*).

Petals none; pods short, more or less oblique, plano-compressed . . . . . 4. *Crudia.*

Petals 1–5.

Leaflets 1 pair; pods short.

Stigma dilated; pods plane, bivalved . . . . . 5. *Peltogyne.*

Stigma small; pods thick, indehiscent . . . . . 6. *Hymenaea.*

Leaflets 2–several pairs; pods indehiscent, linear to oblong.

Sepals and petals 5; pods plane . . . . . 7. *Tachigalia.*

Sepals 4; petals 3, 2 reduced; pods fleshy . . . 8. *Tamarindus.*

Bractlets more or less including the calyx, often persisting, rarely lacking.

Bractlets connate at base; petals rarely 3–5, rarely obsolete; pods oblong or elongate . . . . . 9. *Brownea.*

Bractlets free; one petal clawed, 2 or 4 reduced or lacking; pods ovate-oblong or falcate . . . . . 10. *Macrolobium.*

Cassieae

Leaves abruptly or imparipinnate; calyx lobes free, 5 (3–4) usually imbricate; petals 5 or fewer or none; anthers 2-pored or basifixed, exceptionally versatile but 2-pored (*Cassia*); ovary (or stipe) free.

Petals 3 or fewer or lacking; stamens 2–3; pods often short.

Sepals and petals 3; pods obliquely ovate or oblong. 11. *Apuleia.*

Sepals 5; petals lacking or 1–2; pods ovate-orbiculate or ovoid-globose . . . . . 12. *Dialium.*

Petals 5 (except *Dicorynia* under *Martiusia*); pods usually elongate, terete or flat, often 2-valved.

Leaves abruptly pinnate; seeds usually more than 1; pods various.....13. *Cassia.*

Leaves imparipinnate; seeds often solitary in middle of ample oblong pods.....14. *Martiusia.*

Eucaesalpinieae

Leaves bipinnate (Peruvian) or rarely all but a few simply pinnate; calyx segments free; petals often 5, subequal; anthers versatile; ovary or stipe free unless in *Schizolobium.*

Ovary adnate to the calyx tube; pods samaroid with a solitary seed at tip.....15. *Schizolobium.*

Ovary free; pods not samaroid.

Rachis of leaves scarcely obvious; pods terete (Peruvian). 16. *Parkinsonia.*

Rachis of leaves well developed.

Flowers borne at leafless nodes; pods flattened, narrowly oblong.....17. *Cercidium.*

Flowers axillary or terminal with the leaves; pods various. 18. *Caesalpinia.*

Sclerolobieae

Leaves rarely abruptly pinnate; calyx segments free except *Poeppigia;* petals 5 except *Phyllocarpus,* subequal; ovary free.

Petals 3; pods 1-seeded, plane, thin, the upper suture margined. 19. *Phyllocarpus.*

Petals 5; pods not wing-margined.

Bractlets enclosing buds, persisting; pods compressed, ligneous. 20. *Dicymbe.*

Bractlets caducous, small or none; pods various.

Calyx segments free; leaflets to 13 pairs, medium; pods coriaceous.

Flowers small; pods, if flat, indehiscent.

Stamens 10.

Petals usually narrow; pods flat.....21. *Sclerolobium.*

Petals ovate; pods turgid.....25. *Batesia.*

Stamens 15–20; pods flat.....22. *Campsiandra.*

Flowers showy; pods dehiscing, flat.....23. *Recordoxylon.*

Calyx segments somewhat connate; leaflets small, many; pods membranous.....24. *Poeppigia.*

Bauhinieae

One genus in Peru.....26. *Bauhinia.*

Swartzieae

Leaves pinnate, 1–many; calyx entire, closed before anthesis; petals 1, 5 or none; stamens rarely 10; pods often ovoid, bivalved or indehiscent.

Calyx acuminate; petals 5; leaves 1-foliate.....27. *Lecointea.*

Calyx obtuse; petals 1 or lacking; stamens many; leaves 1–many foliate.....28. *Swartzia.*

Alternate key

Sepals connate; flowers regular, small, in dense racemes or spikes, 5 fertile stamens, 5 staminodia.....1. *Dimorphandra.*

Sepals free or the calyx in bud closed, entire (lobes somewhat connate in *Poeppigia*).

Petals wanting or 1–2 or if rarely 5, 4 greatly reduced (2 in *Krameria*).

Perfect stamens 2–3 (4); pods turgid or globose or scarcely longer than broad.

Trees; fruit smooth.

Sepals 5; staminodia none; anthers basifixed...12. *Dialium.*

Sepals 4; staminodia present; anthers versatile.
10. *Macrolobium.*

Low shrubs; fruit spinose (aberrant group at end of family).
Krameria.

Perfect stamens 8–10 or more numerous and often in 2 series.

Sepals 4, imbricate or valvate.

Bractlets if present free; sepals not petaloid.

Ovary stipe often adnate; racemes simple....4. *Crudia.*

Ovary stipe free; spikes often panicled.....2. *Copaifera.*

Bractlets if present somewhat connate; sepals petaloid.
9. *Brownea.*

Sepals irregular from the splitting of the entire bud or in 3 species cyathiform.....28. *Swartzia.*

Petals 3–5.

Petals 3 or if 5, 2 rudimentary; stamens 2–3 (except in *Phyllocarpus*).

Leaves abruptly pinnate; sepals 4; anthers versatile.

Pods narrowly oblong, turgid; leaves glabrous. 8. *Tamarindus.*

Pods compressed, winged; leaves pubescent. 19. *Phyllocarpus.*

Leaves imparipinnate; sepals 3 (or 5); anthers basifixed; pods obliquely ovate-oblong, compressed. . . 11. *Apuleia.*

Petals 5, equal or subequal; stamens unless rarely in *Bauhinia* 4 or more, usually 10.

Calyx at anthesis cleft, in bud often entire; leaves entire, bilobed or bifoliate.

Anthers versatile; leaves often bilobed. . . . . 26. *Bauhinia.*

Anthers basifixed; leaves never lobed. . . . . 27. *Lecointea.*

Calyx lobes valvate or imbricate.

Anthers basifixed, usually opening by terminal chinks or pores.

Sepals imbricate; stamens 10 (5). . . . . 13. *Cassia.*

Sepals subvalvate; stamens 4 (5). . . . . 14. *Martiusia.*

Anthers versatile, longitudinally slit.

Leaves simply pinnate.

Leaflets 1 pair (cf. *Brownea*).

Flowers axillary, racemose. . . . . 3. *Cynometra.*

Flowers terminal, panicled.

Stigma small; pods indehiscent, fleshy. 6. *Hymenaea.*

Stigma dilated; pods plane, without pulp. 5. *Peltogyne.*

Leaflets more than 1 pair.

Bractlets more or less calyciform or connate about the calyx (rarely lacking); flowers showy.

Flowers usually capitate; ovary stipe adnate. 9. *Brownea.*

Flowers not capitate; ovary free. . . . 20. *Dicymbe.*

Bractlets caducous, none or not as above (cf. *Brownea*, flowers showy, capitate).

Stamens 10.

Leaflets many, small; calyx lobes somewhat connate.....24. *Poeppigia.*

Leaflets to 13 pairs, medium; sepals free.

Calyx oblique; ovary adnate...7. *Tachigalia.*

Calyx campanulate; ovary free.

Petals to 6 mm. long; pods, if flat, indehiscent.

Flowers small, the petals narrow; pods flat.....21. *Sclerolobium.*

Flowers medium, the petals ovate; pods turgid.....25. *Batesia.*

Petals 2 cm. long; pods flat, dehiscing. 23. *Recordoxylon.*

Stamens 15–20.....22. *Campsiandra.*

Leaves bipinnate.

Rachis of leaves scarcely obvious....16. *Parkinsonia.*

Rachis of leaves well developed.

Calyx segments subequal.

Low plants.....18. *Caesalpinia.*

Trees or shrubs.

Flowers borne at leafless nodes..17. *Cercidium.*

Flowers axillary or terminal with the leaves. 15. *Schizolobium.*

Calyx segments unequal, imbricate.18. *Caesalpinia.*

1. DIMORPHANDRA Schott

Trees suggesting in aspect *Mimosa,* the leaves bipinnate, the flowers small, regular, in cylindrical racemes or spikes, the calyx limb 5-dentate, the petals 5, imbricate, the anthers versatile with longitudinal slits, the ovary many-ovuled.—The estivation of the petals is regarded as distinguishing the group from the *Mimoseae.* It approaches *Sclerolobium* but the merely toothed calyx separates it. *Dinizia* Ducke (*D. excelsa* Ducke, Archiv. Jard. Bot. Rio Jan. 3: 76. 1922), large Amazonian tree, is rather similar but has 10 stamens and is actually allied to *Stryphnodendron* but the sepals are imbricate. Ducke, Journ. Wash. Acad. Sci. 25: 193–198. 1935, and Archiv. Jard. Bot. Rio Jan. 4: 41–44. 1925, presented keys to

the known species, the first reference being to those of the section *Pocillum*.

Dimorphandra gigantea Ducke, Journ. Wash. Acad. Sci. 25: 198. 1935.

Young branchlets, petioles, peduncles and rachi of the leaves and inflorescence densely subvillous-velutinous with reddish trichomes; petioles stout; pinnae 18–27 pairs with 32–50 pairs of sessile, linear-oblong, slightly falcate leaflets, the middle larger ones 7 mm. long, scarcely more than 1 mm. broad, the truncate base a little obliquely subauriculate, obtuse or acutish, plane, subcoriaceous, glabrous and barely lustrous above, pale and opaque beneath, the costa obscurely pilose; racemes 7–14, to 3 dm. long, the peduncles somewhat longer; flower-buds subsessile; staminodes and fertile stamens glabrous (each 5) the former with rudimentary anthers, free; ovary brown-villous; pod apparently plane, 2.5–3 dm. long, 1 dm. broad at the middle (only partly destroyed pods known).—Section *Pocillum* Tul., the staminodes more or less petaloid dilated, sometimes united, the few racemes often elongate, the pods bivalvate. The type was from Tabatinga on the Peruvian Amazonian boundary, a tree 50 meters tall, the trunk with high and broad buttresses.

Other species of the same section from the upper Amazon to be expected include the related *D. ferruginea* Ducke, l.c. 197, with pale rusty tomentose pubescence, the leaflets not glabrate beneath.

Peru (undoubtedly). Brazil.

Dimorphandra vernicosa Spruce ex Benth. & Hook. f. Gen. Pl. 1: 588. 1865; Mart. Fl. Bras. 15, pt. 2: 249. 1870.

Glabrous; pinnae 1–2 pairs; leaflets 4–8 pairs, oblong or oval-elliptic, 2.5–5 cm. long; racemes elongate, solitary or few.—Section *Pocillum* as also *D. pennigera* Tul., with 6–10 pairs of pinnae, 20–30 pairs of leaflets 12–25 mm. long. Other species approaching Peru belong to the section *Eudimorphandra* Tul., the staminodia obovate or capitate, always free, the racemes often many, corymbose, the pods according to Ducke indehiscent, for example *D. unijuga* Tul., *D. parviflora* Spruce. The former has solitary or 1–2 pairs of pinnae with 5–9 large leaflets, the latter 8–12 pairs of pinnae, as many pairs of leaflets. Finally *D. excelsa* (Benth.) Baillon or distinct if preferred as *Mora excelsa* Benth. has simply pinnate leaves with 3–4 pairs of many finely reticulate leaflets, the oblong pod dehiscent. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 66*.

Peru (probably). Brazil.

2. COPAIFERA L.

Trees with abruptly pinnate leaves, the often pellucid-punctate leaflets alternate or opposite, and small apetalous flowers sessile in paniculate spikes. Stipules small. Bracts small, rarely subpersisting. Bractlets none. Calyx tube short, the 4 sepals imbricate or subvalvate. Stamens 8–10, free. Ovary stiped; ovules 2; style elongate with terminal truncate stigma. Pods obliquely elliptic or falcate-ovate, rather turgid, 2-valved, the usually solitary seed pendulous, exalbuminous, partly surrounded by the large colored arillus.

Kuntze, who has been followed only by Herzog, has taken up the pre-Linnaean name "copaiba," by which name the dark green oil and resin the trees furnish is known; these products have pharmaceutical and industrial uses.

Copaifera reticulata Ducke, Archiv. Jard. Bot. Rio Jan. 1: 22. 1915.

Branchlets glabrous, the petioles, leaf-rachi and racemes somewhat ashy or slightly rusty-puberulent; leaflets 4–5 (6) pairs, pellucid-punctate, densely and finely reticulate and lustrous both sides, obliquely oblong-elliptic, rounded or acute at base, obtusely acuminate, mostly 3–5 cm. long, 1–2 cm. broad; panicles narrow, often a dm. or two long, the sessile flowers 2–2.5 mm. long, glabrous without, white-villous as the ovary within; pods 1-, sometimes 2- or even 3- or 4-seeded, in the latter cases strongly indented between the seeds, usually with stipe about 5 mm. long; arillus of the seed yellow.—Ducke notes it as a tree 25–30 meters high, with a disagreeable odor, the white flowers fragrant; it furnishes according to him most of the oil and resin of "copaiba." The Peruvian specimens in fruit are completely glabrous and the pod is subsessile. However, as suggested by Harms, they apparently most resemble Ducke's species and may be noted as var. **peruviana** Macbr., var. nov., foliolis glabris. It may be *C. canime* Harms, Repert. Sp. Nov. 24: 210. 1928, with somewhat smaller leaflets, much more densely punctate, the slender elongate spikes finely puberulent.

Other Amazonian species with punctate leaflets to be expected in Peru include *C. guianensis* Desf., 241, and *C. multijuga* Hayne, 241, both with pale coumarin scented bark, acuminate leaflets, the former with 3–4, the latter with 6–10 pairs; the former approaches *C. reticulata* but the leaflets are generally much larger, 7–15 cm. long, 3–4 cm. broad, and the arillus that nearly surrounds the seed

is said to be red. *C. officinalis* L. is in general the same but the leaflets are shortly and obtusely acuminate as in the similar and widely distributed *C. Langsdorffii* Desf., 242, but the latter has leaflets mostly 2–2.5 cm. broad, the former 3–4 cm. broad. The remaining species within our range have leaflets not at all punctate, those of *C. glycycarpa* Ducke, Archiv. Jard. Bot. Rio Jan. 5: 128. 1930, densely tomentose beneath, those of *C. marginata* Benth., 243, and *C. Martii* Hayne, 244, glabrous, the former very rigid, the leaflet edged with a prominent nerve, the marginal nerve in the case of *C. Martii* thin or slender. F.M. Neg. 28043.

Loreto: Yurimaguas, *Williams 4884*. Middle Ucayali, *Tessmann 5475* (det. Harms as affine).—Río Acre: Seringal Iracema (fide Ducke). Amazonian Brazil. "Copaiba."

3. CYNOMETRA L.

Shrubs or trees, the Peruvian species simulating *Hymenaea* and some species of *Bauhinia* in their bifoliate leaves but otherwise like *Copaifera* except that the flowers are in short racemes or panicles, have 5 petals (the lower sometimes minute), imbricate, tardily caducous bracts, bractlets colored if present. Sepals sometimes 5, reflexing. Stamens 10–many. Pods often verrucosely rugose. From *Hymenaea* it is most readily distinguished by the character of the inflorescence.

Leaflets opaque or nearly; pedicels 6–8 mm. long. . *C. bauhiniaefolia.*
Leaflets lustrous; pedicels often 12 mm. long. . . . . *C. Martiana.*

Cynometra bauhiniaefolia Benth. in Hook. Journ. Bot. 2: 99. 1840; 246.

Glabrous except for the younger much-branching branchlets and the short subsessile axillary racemes, these particularly more or less tomentulose; leaflets small, commonly only 3 cm. long, half as wide or smaller, somewhat oblique and very obtuse, venose and with 2–3 nerves; rachis of racemes rarely longer than 2 mm.; sepals petaloid, 3 mm. long, equaling the petals; pods sessile, densely verrucose, ellipsoid, slightly oblique, 1.5 cm. long, 1 cm. thick.—*C. parvifolia* Tul. has leaflets 1–1.5 cm. long, 2–5 mm. broad; it extends from the Guianas to the Amazon region.

Loreto: Río Itaya, *Williams 40*. Iquitos, *Williams 8142*. Pró, *Williams 1984*. Argentina to Central America and the Guianas. "Ampi jacu."

Cynometra Martiana (Hayne) Baillon, Hist. Pl. 2: 164. 1870, by inference. *Trachylobium Martianum* Hayne, Flora 10: 744. 1827; Arzneigew. 11: *pl. 17.* 1830. *C. Spruceana* Benth. in Mart. Fl. Bras. 15, pt. 2: 247. *pl. 65.* 1870.

Small tree resembling *C. bauhiniaefolia* but the leaflets obovate-oblong, shortly acuminate but rather obtusely so, 3–10 cm. long, nearly evenose beneath, the nerves prominent and the looser racemes rusty-villous, their rachi 12–20 mm. long, nearly equaled by the slender pedicels; sepals to 4 mm. long; pods obliquely ovoid, rugose, tomentulose, nearly 2.5 cm. long, to 18 mm. thick.—*C. racemosa* Benth., 246, upper Amazonian, seems to be similar but has obovate leaflets that are not at all acuminate, even emarginate. Benth., l.c. 248, distinguished from the Amazon region var. *procera* Benth., tree 30 meters high, the leaflets less coriaceous and var. (?)*macrophylla* Benth., the leaflets to 1 dm. long, the primary veins conspicuous beneath, the racemes and pedicels longer. Harms referred the Tessmann collection here as "var."

Loreto: Mishuyacu, *Klug 1448; 1416.* Iquitos, *Tessmann 3636.* Brazil.

4. CRUDIA Schreb.

Unarmed trees with imparipinnate leaves, the leaflets alternate, and small flowers borne in racemes terminating the branchlets. Stipules and bracts caducous or sometimes foliaceous or membranous and rather persistent. Calyx tube short with 4 membranous imbricate sepals that reflex in anthesis. Petals none. Stamens usually 10, free, the ovate or oblong anthers on filiform filaments. Ovary stiped, free or adnate; style filiform with small terminal stigma. Pod obliquely orbicular ovate or broadly oblong, plano-compressed, rigid, the margin often thickened. Seeds 1 or 2, laterally emarginated at hilum, the cotyledons plane, the radicle short, straight, included; albumin none.—Name at one time was written "Crudya," conserved as Crudia.

Crudia glaberrima (Steud.) Macbr. Contr. Gray Herb. 59: 20. 1919; 238. *Hirtella glaberrima* Steud. Flora 26: 761. 1843. *C. obliqua* Griseb. Fl. Brit. W. Ind. 216. 1860. *Apalatoa glaberrima* (Steud.) Taub. Bot. Centralbl. 47: 394. 1891.

Glabrous or essentially except the racemes, these shortly peduncled, usually finely puberulent; stipules linear, 1 cm. long, deciduous; leaflets on most leaves 6–9 pairs, obliquely oblong-elliptic or slightly obliquely obovate, more or less abruptly acuminate,

usually 7–10 (15) cm. long, 3–4 (7) cm. wide, chartaceous, reticulate-veined, the midnerve little excentric; racemes often 1–1.5 dm. long, the small bracts and bractlets caducous; pedicels 3–4 mm. long; flowers white, the glabrous or puberulent sepals 4–5 mm. long, the stamens well exserted; ovary reddish-brown villous; pods subsessile, ovate to oblong, 1 to nearly 2 dm. long, half as broad, rigid, coarsely nerved, rusty-tomentose with 1 or sometimes 2 large seeds.—Ducke has proposed *C. aequalis*, Archiv. Jard. Bot. Rio Jan. 3: 91. 1922, for a similar tree but the flowering pedicels 7–12 mm. long, the leaflets rather oblong, commonly 6–12 cm. long, about half as broad; better marked are *C. amazonica* Spruce, 328, *C. pubescens* Spruce, 240, the former with 9–13 narrowly oblong glabrous or nearly glabrous leaflets, the latter with 6–9 oblong leaflets, softly puberulent both sides. The other Amazonian species possibly extending into Peru is *C. bracteata* Benth., the densely flowered racemes with conspicuous persisting bracts and bractlets. Said to attain 10–15 meters. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 62*.

Loreto: Yurimaguas, *Williams 4176A* (det. Harms, *C. Parivoa* DC.). To Trinidad. "Pisho."

Crudia tomentosa (Aubl.) Macbr. Contr. Gray Herb. 59: 20. 1919. *Parivoa tomentosa* Aubl. Pl. Guian. 2: 759. *pl. 304*. 1775. *C. Parivoa* DC. Prodr. 2: 520. 1825. *Apalatoa tomentosa* (Aubl.) Taub. Bot. Centralbl. 47: 394. 1891.

Branches and branchlets tortuous; leaflets 3–5, subsessile, ovate-rhombic, acute, glabrous, the midnerve strongly excentric; pods ovoid, to 6 cm. long, 4 cm. broad, moderately reddish-brown-tomentose.—Except for the fewer leaflets, these becoming 6–11 cm. long, half as broad, the species seems to be similar to *C. glaberrima*. The Williams specimen which Harms referred here had 6 leaflets on one of the two leaves.—F.M. Neg. 7012 (*Parivoa*).

Peru (cf. note above). French Guiana; Brazil (fide Ducke).

5. PELTOGYNE Vog.

Trees with small deciduous stipules, bifoliate leaves and often rather conspicuous and sericeous pubescent flowers borne in terminal or upper axillary or often corymbose panicles. Sepals 4, imbricate, the calyx-tube campanulate or obsolete. Petals 5, somewhat unequal, the twice as many stamens free, the filiform filaments curved in bud, the versatile ovate anthers dehiscing longitudinally. Ovary stiped, adnate, or the ovary subsessile and then free. Style more or

less elongate with dilated slightly lobed terminal stigma. Pods flattened, finally coriaceous, the upper suture sometimes narrowly winged, dehiscent or indehiscent, rarely 2-seeded, the seeds not enclosed in pulp or albuminate, sometimes with a small arillus.

This genus furnishes the well-known wood "purpleheart," referring to the beautiful heartwood, purple or violet in color. One species, *P. paradoxa* Ducke, "coata-quiçaua," is noteworthy for a wax on the leaves (cf. Paul Ledoux, Mission Biol. Belge au Brésil 2: 188–195 with 5 pls. 1929). Curiously enough although there are as many as 14 species known from the Amazonian region—cf. Ducke, Trop. Woods 54: 1–7, for a key to these and citation of publication together with a few notes on each species—apparently none have been found as yet within Peru. The following species and probably others must occur at least as isolated examples.

Peltogyne altissima Ducke, Bull. Mus. Paris sér. 2. 4: 726. 1932.

A tall tree with smooth reddish bark, glabrous except the panicles; petiolules 8–10 mm. long; leaflets 6–9 cm. long, about half as broad, more or less subfalcately obovate-oblong, unequal at the obtuse base, long and abruptly acuminate, thin-coriaceous, lustrous and subconcolor both sides, above distinctly, beneath obsoletely venulose; panicles densely flowered, only the youngest portions of the rachi rusty-pilose, the pedicels at most 2 mm. long, the bractlets finely yellowish-sericeous, promptly caducous; calyx within and without densely yellowish-sericeous, the tube about 3 mm. long, subequaled by the stipe, the segments about 6 mm. long, scarcely 4 mm. broad; petals white to 8 mm. long, linear spathulate, eglandular, the larger white glabrous stamen nearly 2 cm. long; ovary shortly stiped, glabrous.—Attains 50 meters, the wood becoming light violet; found in upland forests as near as São Paulo de Olivença, it is to be expected in Peru.

Peru (probably). Brazil.

6. HYMENAEA L.

Reference: Ducke, Ann. Acad. Bras. Sci. 7: 203–211. 1935.

Usually large trees, with heavy but pellucid-punctate leaves consisting of 1 pair of leaflets, in this respect simulating some species of *Bauhinia* but the calyx divided nearly to base, the imbricate segments 4. Petals 5, somewhat unequal, spathulate. Stamens 10, free. Ovary stipe adnate; style filiform with small terminal stigma. Pods fleshy, indehiscent, the seeds exalbuminous.—The closely

related group *Peltogyne* Vog. has dilated lobed stigma and glabrous pod little longer than broad. Foliage simulates some *Macrolobiums*.

Courbaril supplies the resin copal or "jutahycica" exported from the Amazon; it is dug up from the base of the trees, and at one time was said to make the finest varnish; cf. Le Cointe, Amaz. Bras. 3, Arvores e Plantas Uteis, 1934.

Leaves glabrous.

Ovary glabrous..... *H. Courbaril.*

Ovary pubescent..... *H. oblongifolia.*

Leaves densely pubescent beneath..... *H. palustris.*

Hymenaea Courbaril L. Sp. Pl. 1192. 1753.

Glossy bifoliate-leaved tree sometimes attaining 30 meters; stipules deciduous as the leaves develop, to 3 cm. long; leaflets subsessile, falcately or obliquely ovate-oblong, typically acute, 5–10 cm. long, 2–4 cm. wide; panicles usually short, corymbose; bracts and bractlets orbicular; sepals thick, tomentulose both sides, to 1.5 cm. long, the narrowly campanulate tube a third as long; petals glabrous, 1.5 cm. long and a third as wide; pod typically rather compressed and stiped or, in var. *subsessilis* Ducke, subcylindric (leaflets acute) as also in var. *obtusifolia* Ducke, several cm. long, nearly half as thick, with 2 or more seeds surrounded by a mealy edible pulp.

Río Acre: Near mouth of Río Macauhán, *Krukoff 5519*. Brazil to West Indies and Colombia. "Courbaril."

Hymenaea oblongifolia Huber, Bol. Mus. Goeldi 5: 386. 1909.

A large tree, the branches with longitudinally fissured bark; petioles 2–2.5 cm. long; leaflets elongate oblong scarcely falcate, rounded or obscurely acuminate, strongly inequilateral at base, 12–14 cm. long, 4.5 cm. broad, coriaceous, lustrous both sides, the nerves prominent beneath, the veins immersed; racemes finally to 12 cm. long, laxly panicled, yellowish tomentulose, the suborbicular bracts and bractlets 5 mm. long, promptly caducous, pedicels scarcely 3 mm. long; calyx tube broadly obconic, less than half as long as the broadly ovate sericeous tomentulose lobes, these about 8 mm. long; petals glabrous, slightly reddish, oblanceolate, 12 mm. long, 5 mm. broad; stamens 18 mm. long; ovary distinctly hirsute, base to apex, the glabrous style scarcely 1 cm. long.—F.M. Neg. 28094.

Loreto: Florida, 10 meters high, flowers cream and rose, *Klug 2291*. Mishuyacu, *Klug 1339* (det. Killip).—Río Acre: Río Macauhán, *Krukoff 5472*. Brazil. "Jutahy."

Hymenaea palustris Ducke, Archiv. Jard. Bot. Rio Jan. 1: 24. 1915.

Similar to *H. oblongifolia* but strikingly distinct by the dense lustrous reddish pilosity that covers the leaves beneath; leaflets lustrous but slightly pilose above, acute or obtuse, to 16 cm. long, 4.5 cm. broad; pedicels to 2 mm. long; petals slightly greenish; stamens to 15 mm. long; fruit subcompressed-ovoid, 5.5 cm. long, about 2.5 cm. thick.—Tree 20–40 meters high with straight trunk, the crown almost flat, clear of limbs for almost two-thirds the height and with small buttresses. The brown bean-like seeds are imbedded in a mealy sweet edible pulp to which the Spanish-Quechua name "sugar-fruit" refers; the timber is of good quality (Williams). *H. adenotricha* Ducke, l.c. 6: 21. 1933, known from one tree as near as São Paulo de Olivença, Brazil, is similar but the trichomes on the leaves beneath are glandular at base, the flowers white and the ovary pubescent only on one side at apex. F.M. Neg. 28095.

Loreto: Stream banks and dense forests, Río Itaya, *Williams 2053* (det. Harms); *3453*. Brazil. "Azucar-huayo."

7. TACHIGALIA Aubl.

Smooth shrubs or trees becoming tall, the ample leaves abruptly pinnate with coriaceous opposite leaflets, their rachi often angled, the small or medium-sized flowers racemose or spicate in terminal or subterminal panicles, or the inflorescence simple. Bracts narrow, caducous, bractlets none. Calyx-tube short but strongly oblique, the 5 unequal sepals imbricate. Petals 5, subequal, clawed, often villous within as are usually the 10 stamens toward the bases of the filaments, the upper 3 of them ordinarily thicker or shorter. Ovary stipe more or less adnate. Pods flat, oblong, indehiscent, the few seeds with thin albumin and cotyledons, the latter foliaceous.—Spelled *Tachigali* by Aublet. Nearly *Sclerolobium* except for the oblique calyx and the adnate stipe of the ovary.

Known as "tachi" or "tachizeiro" in allusion to the ants (species of *Pseudomyrma* or *Azteca* according to Ducke) that inhabit the inflated petioles or inflorescence rachi of many species. Apparently the inflated portions are peculiar to certain species but seemingly too many have been described and the following key is therefore

only suggestive; however, fruit of few species is as yet known and the much-needed revision of the group may disclose specific floral differences. It is probable that the species of Tulasne, Arch. Mus. Paris 4: 163 et al., reduced by Bentham should be reconsidered.

Petioles, at least some of them, often also the leaf-rachi, more or less inflated (cf. *T. paniculata*).

Leaflets silvery-sericeous both sides, 3–4 pairs.....*T. cavipes.*

Leaflets pubescent beneath or glabrous, or at least green-colored in age, 4–6 pairs.

Leaflets very oblique, the midnerve strongly excentric; petals long hirsute within.....*T. formicarum.*

Leaflets little oblique, the midnerve slightly excentric; petals lightly hirsute within.....*T. Tessmannii.*

Petioles not inflated but sometimes hollow.

Petals pale yellow or whitish; calyx-tube 7 mm. long or shorter.

Leaflets 4–8 pairs; stamens 8–10 mm. long.....*T. paniculata.*

Leaflets 7–15 pairs; stamens about 5 mm. long...*T. polyphylla.*

Petals orange; calyx-tube 10 mm. long.....*T. longiflora.*

Tachigalia cavipes (Spruce) Macbr., comb. nov. *T. paniculata* Aubl. var. *cavipes* Spruce ex Benth. in Mart. Fl. Bras. 15, pt. 2: 229. 1870.

Tree, the angled branchlets, petioles and leaflets uniformly sericeous with closely appressed trichomes, these lustrous or less so in age; stipules foliaceous, oblong-lanceolate, acuminate, to 1.5 cm. long, subpersistent; petioles grooved above, medially inflated; petiolules about 4 mm. long; leaflets strongly oblique, oblong-lanceolate, rounded or somewhat acute at base, gradually acuminate, mostly 8–14 cm. long, 2.5–3.5 (4) cm. broad, subcoriaceous; pedicels 3–4 mm. long; calyx-tube about 7 mm. long, equaled by the reflexed lobes, these appressed-sericeous both sides; petals 5 mm. long, densely appressed-hirsute within except around the margins; stamens 9 mm. long; pods shortly stiped, oblong, minutely and very sparsely pubescent, opaque, 6 cm. long, 2 cm. broad.—Amshoff has referred this tree to *T. glauca* Tul. Arch. Mus. Paris 4: 162. 1840, from Surinam but it seems probable that the species of Tulasne described as having terete petioles is not the same. Rather similar Amazonian species include *T. ptychophysca* Spruce, 229, well marked by the 3–4 plinerved leaflets, these 5–8 pairs becoming glabrate; *T. myrmecophila* Ducke, Archiv. Jard. Bot. Rio Jan. 1: 30. 1915; l.c. 3: 91. 1922,

petiolules 6–10 mm. long, petals only slightly hirsute within down the middle; *T. rigida* Ducke, Archiv. Inst. Biol. Veg. Rio Jan. 4: 12. 1938, including var. *argentata* Ducke, l.c., the pubescence not uniform, the leaflets rigid-coriaceous, the nerves with longer trichomes. F.M. Neg. 1533.

Loreto: Palta-Cocha, on the upper Río Nanay, *Williams 3192* (det. Harms). Brazil. "Caracha-caspi."

Tachigalia formicarum Harms, Verh. Bot. Ver. Brandenb. 48: 164. 1907.

Branchlets as the petioles and leaflets beneath minutely appressed-puberulent or nearly glabrous; petioles acutely triangular, more or less inflated near the base; leaflets 4–6 pairs (petiolules 4–6 mm. long), oblong or the smaller ovate-oblong, unequally rounded or obtuse at base, acute or very shortly acuminate, 7–20 cm. long, 3–5.5 cm. broad, pinnately nerved, the midnerve of the larger strongly excentric, minutely reticulate-veined and lustrous and equally green both sides; stipules foliaceous, subpersisting, sometimes pinnately lobed; panicles ample, rusty-puberulent, the spikes very densely flowered, the flowers sessile; sepals 4–5 mm. long, about as long as the tube, pubescent both sides; petals about 4 mm. long, hirsute within, scarcely exceeded by the stamens, these hirsute at base.—The type from a tree about 20 meters high, the flowers yellowish. *T. carinata* Gleason, Bull. Torrey Club 60: 354. 1933, from Matto Grosso, Brazil, may be distinguished, fide the author, by its conspicuously lobed stipules, 7–9 pairs of leaflets, elongate canescent spikes, petals 7 mm. long. F.M. Neg. 1531.

San Martín: Tarapoto, *Ule 6538*, type.—Loreto: Canchahuaya, (*Huber*). Palta-Cocha, on the upper Río Nanay, *Williams 3192* (in part).

Tachigalia longiflora Ducke, Archiv. Inst. Biol. Veg. Rio Jan. 2: 38. 1935.

Small tree, glabrous except for a minute puberulence on the branchlet tips and a dense rusty indument on the simple or sparsely branched racemes; petioles and rachis often more than 4 dm. long, triangular, usually partly excavated by ants; leaflets 4–9 pairs, shortly and stoutly petiolulate, commonly 1–2 dm. long, 4–6 cm. broad, obliquely or ovate-oblong, rounded or cordate at base, long acuminate, coriaceous, reticulate-veined and somewhat lustrous both sides, a little paler beneath; pedicels short, stout, the calyx-

tube to 10 mm. long, the segments nearly as long, the inner ones much narrower; petals about 10 mm. long, glabrous except within at base.—Affine according to the author *T. multijuga* Benth. with subterete petioles, leaflets 9–15 pairs, the panicles ample, the inner calyx segments not petaloid. *T. grandiflora* Huber, Bol. Mus. Goeldi 5: 388. 1909, and *T. macrostachya* Huber, l.c., also have large orange-yellow flowers but both have a shorter calyx-tube and more than 15 (instead of 7) stamens; the former has oblong leaflets, obtuse or rounded at base, acutely acuminate, minutely puberulent both sides, the latter glabrous leaflets cordate at base, shortly and obtusely acuminate. The type of the Ducke species being as near Peru as São Paulo de Olivença is to be expected within Peru.

Peru (probably). Brazil.

Tachigalia paniculata Aubl. Pl. Guian. 1: 372. *pl. 143.* 1775; 228.

Shrub or tree with angled branchlets and acutely angled or sometimes nearly winged petioles, both as usually the leaflets beneath at least before maturity minutely puberulent; stipules foliaceous, trifoliate or pinnate; leaflets usually 7 pairs (5–8), oblong (or in Peru, ovate-oblong), obliquely rounded at base, gradually acuminate, 7–15 (19) cm. long, 3–4.5 (7.5) cm. broad, subcoriaceous, finely reticulate-veined both sides, the midnerve slightly excentric; racemes few, often becoming 2–3 dm. long, angled, puberulent; pedicels 2–5 mm. long, calyx-tube strongly oblique, the sepals 4–7 mm. long; petals yellow, rusty-pilose within medially; stamens declinate, 8 mm. long; pods membranous, oblong, shortly stiped, glabrate in age, 6–9 cm. long, 1.5–2 cm. broad.—*T. alba* Ducke, Archiv. Jard. Bot. Rio Jan. 3: 92. 1922, to which *Krukoff 5586* has been referred in herbaria (but this specimen has acute-angled petioles) is according to the author distinguishable from the Aublet tree by its much greater size (25–35 meters high), white bark, branchlets and leaflets glabrous even the younger, petioles slender, terete, narrowly grooved above, panicles often to 5 dm. high, flowers smaller, petals whitish, very sparsely pilose. *T. grandistipulata* Harms, Notizbl. Bot. Gart. Berlin 6: 304. 1915, has the younger leaves sericeous both sides, glabrate above in age and stipules 2.5–6 cm. long and with a lateral smaller leaflet. Determinations by Harms except the Schunke specimen. F.M. Negs. 21913; 32088.

Loreto: Near Iquitos, *Klug 1027; 1447; Tessmann 3666.* Leticia, *Ule 6196.* Río Mazán, *José Schunke 26.*—Río Acre: Mouth of Río Macauhán, *Krukoff 5586.* Brazil to the Guianas. "Tachi branco."

Tachigalia polyphylla Poepp. & Endl. Nov. Gen. & Sp. 3: 60. *pl. 265.* 1845; 230.

Tree, the densely leafy branchlets angled or slightly compressed, minutely and deciduously rusty-puberulent; stipules caducous; petioles semi-terete or compressed below, obtuse, tetragonous, deeply sulcate to terete at tips; leaflets 9–15 pairs, oblong, strongly oblique at base, acuminate, subcoriaceous, very sparsely and minutely pubescent above except on the excentric midnerve, more densely puberulent beneath and discolored, mostly 10–12 cm. long, about 3 cm. broad; pedicels scarcely 1 mm. long; calyx 5 mm. long, sericeous, the lobes and tubes subequal, the former little exceeded by the petals, these rather densely pilose within; stamens only about 4 mm. long. —Attains 25 meters or more, the trunk straight, round, the bark rough, the wood very hard, white (Poeppig). Allied according to Bentham to *T. multijuga* Benth. but the flowers smaller, the calyx scarcely attenuate at base. It is probable that the flowers may be somewhat larger than described, the stamens longer.

Peru (probably). Amazonian Brazil.

Tachigalia Tessmannii Harms, Notizbl. Bot. Gart. Berlin 9: 967. 1926.

Resembles *T. formicarum;* branchlets glabrous; leaflets more or less oblique, abruptly and shortly acuminate, obscurely if at all puberulent beneath, chartaceous, the midnerve subcentral or moderately excentric.—Trunk diameter of the type 2 dm., the strongly inflated petioles filled with ants, the stings of which are extremely painful (Tessmann). *T. Ulei* Harms, l.c. 6: 306. 1915, has 3–4 pairs of oblong gradually acuminate leaflets. *T. grandistipulata* Harms, l.c. 304, noted under *T. paniculata* might be sought here on account of its somewhat hollowed and enlarged petioles. F.M. Neg. 1538.

Loreto: Puerto Meléndez, below Pongo de Manseriche, flood-free wood, *Tessmann 4753,* type.

8. TAMARINDUS L.

Related to and resembling *Macrolobium,* the cultivated Tamarind may be known by its imparipinnate leaves, the numerous leaflets small, and by its rather Cassia-like flowers, the petals however only 3, the two lower rudimentary and pinkish or red-veined, the fertile stamens the same number, their filaments united. Bractlets char-

taceous. Pods indehiscent, narrowly oblong with thin brittle epicarp and pulpy mesocarp.

Tamarindus indica L. Sp. Pl. 34. 1753; 227.

Glabrous except for the laxly flowered racemes, these several to 10 cm. long; leaflets 10–20 pairs, oblong, rounded or retuse, 1.5–2.5 cm. long, about 5 mm. wide; bracts and bractlets pink while enclosing the buds; pedicels to 5 mm. long; sepals and petals 1 cm. long; fruit 5–15 cm. long, 2–2.5 cm. thick, the pulp acid.—A refreshing drink is made from the pulp of the pods. Illustrated, Bot. Mag. *pl. 4563;* Degener, Fl. Hawaii.

Peru: Cultivated. Africa.

9. BROWNEA Jacq.

Browneopsis Huber, Bol. Mus. Goeldi 4: 565. 1906.

Reference: Pittier, Contr. U. S. Nat. Herb. 18: 145–157. 1916.

Smooth trees, the stems often weak and low or clambering, the leaves abruptly pinnate with subcoriaceous usually caudate leaflets, the flowers showy, red or whitish and borne in short racemes or often in large heads on the trunks or at the tips of short branchlets more or less concealed in the foliage. Stipules foliaceous, sometimes colored, caducous. Bracts and bractlets (these sometimes lacking) often colored, the former caducous, the latter if present more or less connate and enclosing (as a sheath) the turbinate-campanulate calyx, this with usually 4 petaloid imbricated segments. Petals and stamens exserted, the former 5, or only 3–4 and ligulate or even obsolete, ovate or oblong, imbricated, subequal, the latter 10–15 (20) free or somewhat united below the middle, the anthers uniform, oblong, longitudinally dehiscent. Ovary stiped, adnate to calyx-tube, many-ovuled, the filiform style with terminal capitate stigma. Pods oblong or elongate, plano-compressed, the upper suture often enlarged. Seeds transverse, ovate, much flattened, exarillate, without albumen, the cotyledons thin, the radicle short, straight, included.—*Elizabethea* Schomb. has 3 fertile stamens, 5–7 staminodes (sometimes imperfectly antheriferous), 3–5 petals, one or more sometimes greatly reduced.

Cultivated as "rosa de montaña."

Leaf-rachis or at least the branchlets more or less densely villous; leaflets more than 4 pairs; stamens 10 or 11.

Petals to 1.5 cm. broad, obovate-spathulate..... *B. ariza.*

Petals twice as broad.....*B. Macbrideana.*

Leaf-rachis glabrous or merely puberulent; stamens 10–20.

Leaflets 8–14 pairs; connate bractlets (sheath) present.
B. loretensis.

Leaflets 2–4 pairs; bractlets lacking or separate.

Leaflets about a third as broad as long; petals 3 or 4, rudimentary and ligulate, sessile.

Leaflets 2 (3) pairs; outer bracts glabrous; sepals sericeous.
B. cauliflora.

Leaflets 3–4 pairs; bracts tomentose; sepals sparsely puberulent.....*B. ucayalina.*

Leaflets 7–15 cm. long, half as broad; petals 4; clawed bractlets or sepals 2.....*B. peruviana.*

Brownea ariza Benth. Pl. Hartw. 171. 1857; 150.

Young branchlets as also the leaf-rachis at first ashy or rusty-villous, the latter becoming glabrous or more or less verruculose; petiolules to 6 mm. long; leaflets usually 6–10 pairs, all except sometimes the considerably smaller lowest ones oblong-elliptic, abruptly caudate-acuminate, the acumen slender, obliquely marginate at base, 8–16 cm. long, 2–5 cm. broad; inflorescence axillary or terminal, the rachis more or less pubescent, the pinkish bracts ashy-tomentose without, the basal ones about 4 cm. long; pedicels pubescent, 7–8 mm. long; sheath 2.5 cm. long, puberulent, bilabiate, the lobes subacute; receptacle tube 17 mm. long, glabrous without, pubescent within; sepals 4, 18 mm. long, the anterior one 15, the others 8 mm. broad; petals about 3.5 cm. long, 13 mm. broad, the lateral narrower with long and slender claw; stamens 11, free or somewhat connate and pubescent below, to 4 cm. long; pods compressed, sulcate on the dorsal suture, bisulcate on the ventral, hirsute-tomentose, 4-seeded, 15–18 cm. long, 4.5–5 cm. broad, on pedicels 2.5 cm. long, often surrounded by the persistent bractlets, the stipe 7 mm. long; seeds elliptic-ovate, depressed, 5 cm. long, half as broad, about a third as thick, rugose-striate.—Tree sometimes attaining 20 meters. Sulcate branchlets are a characteristic of *B. grandiceps* Jacq., similar tree of Venezuela, the rachis of the leaves more permanently pubescent, petals 2 cm. broad, but the species are sometimes distinguishable with difficulty and, according to Ducke, hybridize. This author suggests that *B. negrensis* Benth. (actually of the upper Amazon) is based upon an incomplete specimen of Jacquin's species, the upper leaves of

which may have only 2 pairs of leaflets. Description after Pittier. Illustrated, Pittier, l.c. *pls. 59–62.*

Peru (perhaps). To Panama. "Monterillo," "palo-de-cruz," "fanise-ey" (Huitoto).

Brownea cauliflora Poepp. & Endl. Nov. Gen. & Sp. 3: 82. *pl. 292.* 1845. *Browneopsis cauliflora* (Poepp. & Endl.) Huber, Bol. Mus. Goeldi 4: 567. 1906.

Glabrous tree with branches lax, the branchlets terete, punctulate; petioles 4 mm. long, rugulose; leaflets 2, rarely 3 pairs, sometimes solitary, oblong-elliptic, obtusely acuminate, slightly narrowed and obliquely obtuse at base, the larger 2 dm. long, about 7 cm. broad, membranous, eglandular, pale green, scarcely lustrous above, opaque beneath, the nerves rather prominent; flowers in subglobose heads, solitary or several on the trunks or short branchlets, densely bracteate with subrotund or broadly ovate obtuse finely striate glabrous purplish bracts, the inner membranous, appressed-tomentose both sides, roseate; flowers many, with the stamens more than 5 cm. long, bractlets promptly deciduous; calyx-tube obovate, subtetragynous, subhirsute at throat, glabrous without, 6 mm. long, the segments erect, scarcely clawed, oblong-obovate, often slightly connate, glabrous within, lustrous-pubescent without; stamens 15–20, nearly three times longer than the petals, all fertile, filaments connate below, glabrous; ovary reddish-pubescent, the style glabrous; pods pendent, 2 dm. long, 3 cm. broad, the dorsal suture broadly margined, the valves coriaceous, puberulent, transversely rugulose, with 6 or 7 compressed lustrous seeds.—F.M. Neg. 1555.

Loreto: Yurimaguas, *Poeppig 2314*, type.—San Martín: Juanjuí, tree 8 meters high with red-brown and yellow flowers, *Klug 4163* (probably).

Brownea loretensis Standl. Field Mus. Bot. 22: 144. 1940.

Glabrous or essentially, except the capitate inflorescences, the slender subterete branchlets tuberculate-lenticellate; petioles 2–3.5 cm. long, the markedly slender dark-colored lustrous leaf-rachis 8–18 cm. long, the alternate or subopposite 8–14 pairs of narrowly oblong leaflets on petiolules about 3 mm. long; leaflets sometimes oblanceolate, rounded at base, beautifully abruptly caudate acuminate (the nearly linear acumen nearly 2.5 cm. long), mostly 7–11 cm. long, 2–3 cm. broad, subcoriaceous, glabrous and somewhat lustrous above, slightly paler, opaque and finely venulose beneath,

the slender midnerve sparsely hispid or glabrous; inflorescence terminal, many-flowered, the rachis 3.5 cm. long, densely rusty-tomentose; outer bracts subrotund, sericeous, pubescent, the inner obovate spathulate, 4 cm. long, 1.5 cm. broad, rusty-tomentulose both sides, as also the bractlets without, these 22 mm. long, connate to the middle; calyces 4.5 cm. long, glabrous or very sparsely pilose, the segments spathulate oblong; petals to 6.5 cm. long, red apiculate at the rounded tip.—Type from a tree 10 meters high, the trunk about 15 cm. in diameter. Pedicels 5–10 mm. long; the inflorescence reminds one of the large-flowered *Bomareas;* the author ventures no suggestion as to relationship. *B. Herthae* Harms, Notizbl. Bot. Gart. Berlin 14: 30. 1938, Ecuadorian, has calyx-tube extremely narrow, much larger leaflets; *B. multijuga* and *B. stenantha,* both Britton & Killip species of Colombia, Ann. N. Y. Acad. Sci. 35: 168. 1936, may be related but the latter has leaflets puberulent beneath, the former quadrangular rachis.

Loreto: Río Mazán, on rising ground, *José Schunke 11,* type. Florida, *Klug 2188* (inflorescence young, congested). "Palo de cruz."

Brownea Macbrideana Standl., spec. nov.

Arbor 12-metralis; folia magna, fere sessilia, rhachi crassa dense sordido-tomentosa; foliola ca. 12 insigniter inaequalia crasse petiolulata crasse membranacea longe caudato-acuminata, supra lucida glabrata, subtus glauca primo adpresso-tomentulosa, serius glabrata; foliola terminalia oblanceolato-oblonga ca. 26 cm. longa atque 9 cm. lata, basi obtusa vel anguste rotundata; foliola inferiora breviora, infima late ovata basi cordata ca. 10 cm. longa atque 6.5 cm. lata; inflorescentia perfecta non visa; calyx fere tubulosus superne dilatatus 4.5 cm. longus dense adpresso-tomentulosus breviter lobatus; petala magna lataque 1 cm. longe unguiculata, ovalia vel suborbicularia ca. 4.5 cm. longa et 3 cm. lata glabra, apice late rotundata; vagina staminalis 1.5 cm. longa laxe tomentosa vel supra glabrata, filamentis ca. 8 cm. longis glabris; antherae 4 mm. longae.—Flowers fire-red. The species is related to *B. grandiceps* Jacq., which, however, has petals 2 cm. wide or narrower.

Loreto: Florida, Río Putumayo, at mouth of Río Zubineta, in forest, altitude about 200 meters, *G. Klug 2035* (type in Herb. Field Mus.). "Cacao silvestre."

Brownea peruviana Macbr., spec. nov.

Arbor 5–8 m. alta glabra; ramulis teretibus tenuibus; petiolis 8–12 mm. longis, petiolulis 2–3 mm. longis; foliolis 1–2 jugis valde

oblique ellipticis basi acutis, apice subabrupte caudato-acuminatis 8 vel 15 cm. longis, 3.5–4 vel 7 cm. latis plus minusve rigide chartaceis, vix nitidulis utrinque satis prominenter reticulato-venulosis; floribus paucis sessilibus bracteis valde concavis, glabris, 1–2 cm. longis, 6–10 mm. latis; receptaculis campanulatis 4 mm. longis, leviter pilosis; bracteolis(?) 2 coloratis petaloideis late ovato-ellipticis circa 1.5 cm. longis, 1 cm. latis; petalis 4, obovatis longe angusteque unguiculatis 16 mm. longis, 2 majoribus 6 mm. latis, 2 minoribus 3–4 mm. latis; staminibus 11 glabris ad basin satis connatis 3 cm. longis, antheris fere 4 mm. longis; ovario breviter stipitato (stipite calycem tubo hinc adnato) dense fulvo-villoso.—With the facies of *Brownea* but perhaps incorrectly placed here; the material is not ample but evidently there are only 4 petals; I may not have succeeded in determining accurately the structure of the flower and bractlets; the sepals perhaps have fallen but apparently the status is as described and therefore the species is aberrant; in the segregate proposed by Huber (*Browneopsis*) the petals are lacking or are rudimentary; if they are absent here the sepals are narrowly long-clawed. The calyx-tube is like that of *B. cauliflora* and *B. ucayalina*. **B. excelsa** (Pittier) Macbr., comb. nov. (*Browneopsis excelsa* Pittier, Contr. U. S. Nat. Herb. 18: 157. 1916), of Panama has petals attenuate into a slender claw as in *B. peruviana* but there are also 4 sepals and 14–15 stamens. The specimens were distributed as *Macrolobium* sp.

San Martín: Juanjuí, river bank, *Klug 4391*, type; *3810*.

Brownea ucayalina (Huber) Ducke, Archiv. Jard. Bot. Rio Jan. 4: 51. 1925. *Browneopsis ucayalina* Huber, Bol. Mus. Goeldi 4: 566. 1906.

A low or laxly growing tree, apparently from the description similar to *B. cauliflora* but the leaflets ordinarily 4 pairs, less frequently only 3, the bracts, even the outer, rusty-tomentulose, the calyx-tube cylindrical or more or less obconic and the sepals minutely and sparsely puberulent, the margins ciliate, glabrous within; petals 3 or 4, rudimentary, ligulate; stamens 12–15; pods rusty-tomentose, 18 cm. long, 3.5 cm. wide, the valves spirally contorted after dehiscence.—There is a drawing of the flowering parts, Huber, l.c. 565.

Loreto: Paca, Río Ucayali, (*Huber 1566*).

10. MACROLOBIUM Schreb.

Vouapa Aublet; *Pseudovouapa* Britton & Killip.

Smooth trees with many of the characters of *Brownea* except that the leaves are rarely somewhat imparipinnate (leaflets some-

times few or solitary), the stipules foliaceous or minute, the flowers small or medium, yellow or usually white with red stamens and borne in single terminal and axillary racemes or shortly fasciculate-paniculate, and especially, the bractlets spreading at anthesis, often enclosing calyx (this rarely reduced), petal apparently only one, the 2 or 4 lower petals much smaller, scale-like or wanting, the perfect stamens only 3 (7 staminodia or reduced or none), the pods little if at all longer than broad, generally bivalvate and elastically dehiscent with few (or 1) large ovate or orbicular seeds.—*Eperua* Aubl. to be expected has 1 petal, 10 stamens, small or caducous bractlets, large rigid pods.

According to Ducke, Trop. Woods 65: 21–31. 1941, "Revision of the *Macrolobium* species of the Amazonian Hylaea," with key and habital notes but without references or descriptions, none of the species are true forest trees, except for isolated examples, but in flower are conspicuous along shores in wet places or in more open forest on higher ground. Besides the following a number of species with 2 or more pairs of leaflets will probably be found within Peru.

Leaflets many, small.

Sepals and bractlets subequal; racemes villous-puberulent. *M. acaciaefolium.*

Sepals much reduced; racemes pulverulent..... *M. machaerioides.*

Leaflets 2–3 pairs, medium..... *M. microcalyx.*

Leaflets 2, large.

Calyx-tube very short, much shorter than bractlets; flowers small.

Inflorescence distinctly puberulent.

Bracts and bractlets subequal, the former subpersisting. *M. chrysostachyum.*

Bracts and bractlets unequal, the former minute, caducous. *M. bifolium.*

Inflorescence glabrous.

Racemes short, congested; leaflets ample..... *M. limbatum.*

Racemes elongate, open; leaflets medium..... *M. punctatum.*

Calyx-tube narrow, about equaling bractlets; flowers to 2 cm. long.

Leaflets 2.5–4.5 cm. wide, 6–10 cm. long..... *M. stenocladum.*

Leaflets 4.5–8 cm. wide, 15–25 cm. long..... *M. ischnocalyx.*

Macrolobium acaciaefolium Benth. in Mart. Fl. Bras. 15, pt. 2: 224. 1870. *Outea acaciaefolia* Benth. in Hook. Journ. Bot. 2: 94. 1840.

Elegant tree glabrous at least at maturity but often the margined rachis of the 15–30 foliate leaves and the branchlet tips more or less puberulent, the short axillary racemes always ashy-tomentulose, even including the bractlets; branchlets short, densely leafy; leaves 1–2 dm. long, the linear-oblong leaflets retuse at tips, 2–3 cm. long, 5 mm. wide, somewhat lustrous above, paler beneath, the veinlets obscure; racemes more or less recurving, to 3 cm. long; pedicels short, rarely 2 mm. long, bractlets ovate, obtuse, about 5 mm. long, subequaled by the glabrous sepals; petal long-clawed, orbiculate, 7–8 mm. long; ovary 2–3-ovuled, shortly stiped, hirsute at the suture, the pod glabrous, suborbicular, 4.5–6 cm. long, 1-seeded, indehiscent.—Flowers with red filaments. Slender tree 10–30 meters high, developing best on flooded areas (Ducke); the trunk without root insertion, the bark dark gray with vertical cracks and hand-size scales densely covered with irregularly shaped lenticels (Amshoff). Harms with query referred *Williams 1098* to *M. taxifolium* Spruce but the leaflets of that species are at most 2.5 cm. long and more numerous, the stipules large and subpersisting; the species are very similar if indeed distinct. *M. brevense* Ducke has distinctly lineate-nerved leaflets, the branchlets and inflorescence, this to 5 cm. long, gray-pilose; cf. Archiv. Jard. Bot. Rio Jan. 4: 51. 1925, for comparison of it with *M. Huberianum* Ducke and *M. gracile* Benth., both with indistinct or obsolete nervation, the former glabrous, its leaflets 7–24 mm. long; Ducke, Archiv. Inst. Biol. Veg. Rio Jan. 2: 40. 1935, has proposed yet another ally, *M. longipedicellatum*, glabrous like *M. Huberianum* but stipules caducous, leaflets 10–15 pairs. All of these, unless *M. longipedicellatum*, have, according to Ducke, oblique-angled dehiscent pods.

Loreto: Caballo-Cocha, *Williams 2420*. Río Nanay and Río Itaya, (*Raimondi*). Iquitos, *Tessmann 3673* (det. Harms). Mishuyacu, *Klug 1417*. Manfinfa, *Williams 1098* (det. Harms, *M. taxifolium* Benth., probably).—Río Acre: On terra firma, near mouth of Río Macauhán, *Krukoff 5599*. To Venezuela and the Guianas. "Chavapallana," "pashaca," "pasha-quilla," "aripari," "arapary," "arapary da varzea," "faveira."

Macrolobium bifolium (Aubl.) Pers. Syn. Pl. 1: 39. 1805; 221. *Vouapa bifolia* Aubl. Pl. Guian. 1: 25. *pl. 7*. 1775.

Glabrous except for the closely tomentulose racemes, these 2.5–7.5 cm. long, variously borne but mostly axillary, erect or reflexed; leaflets 2, sessile or subsessile, shortly, usually obtusely, acuminate,

oblique and more or less falcate, veiny, lustrous, commonly about 1 dm. long, 4 cm. wide or wider; bracts minute, promptly caducous, the ovate bractlets to 6 mm. long; pedicels 2–4 mm. long; calyx-tube shortly stiped, 3 mm. long, the segments 2–3 times as long, obtuse, concave; petal about 1 cm. long, long-clawed, the orbicular blade crisped; ovary tomentose; pods oblique, puberulent, 8–12 cm. long, 5–7 cm. broad, the enlarged upper suture several–10 mm. wide. —Tree with grayish-brown bark, sometimes 20 meters high, the branchlets many, the deciduous stipules linear, the flowers white with red stamens.—*M. retusum* Huber, Bol. Mus. Goeldi 7: 290. 1910, is marked by its broadly obovate retuse leaflets.

Peru(?): "Amazonas," *Tessmann 3658*. To Bahia and Trinidad. "Soliman," "machinmango."

Macrolobium chrysostachyum (Miq.) Benth. in Mart. Fl. Bras. 15, pt. 2: 220. 1870. *Vouapa chrysostachya* Miq. Stirp. Surin. Sel. 11. 1850.

Rather similar, especially in foliage, to *M. bifolium* but the racemes hirtellous, the leaflets falcate-acute or acuminate and the bracts conspicuously subpersisting and imbricate toward their tips; bractlets as bracts ovate, tomentulose, 6 mm. long; pedicels about 2 mm. long; calyx subsessile, the sepals about twice as long; ovary glabrate, the pod glabrous.—Low tree, the grayish-brown bark with roundish scales 2–20 cm. broad and with thickly set wart-like brown lenticels (Amshoff). Flowers white; in the Klug and Schunke specimens reported as reddish-brown; in the latter they are sessile; both these collections seem rather to be *M. bifolium* but not compared by me. F.M. Neg. 1545.

Loreto: Iquitos, *Klug 1353* (affine, Harms). Río Mazán, 16-meter trunk 5 dm. in circumference, *José Schunke 85; 329* (det. Killip). Brazil to Venezuela and the Guianas.

Macrolobium ischnocalyx Harms, Notizbl. Bot. Gart. Berlin 9: 968. 1926.

Small tree with glabrous branchlets and leaves, the latter with 1 pair of oblong-lanceolate, subcoriaceous leaflets, cuneate at base, rather long acuminate, 2–2.5 dm. long, 4.5–7 cm. broad, opaque, scarcely conspicuously reticulate-veined both sides; racemes 2–4 or solitary at the apex of short branchlets, densely flowered, the minute puberulence extending to the sepals; pedicels 3–6 mm. long; bractlets obovate, apiculate, often high-connate, 10–11 mm. long, 5 mm.

broad; calyx-tube narrowly cylindrical, 10–12 mm. long, the pedicelliform portion 5–7 mm. long; sepals 4, subequal, nearly 1.5 cm. long, 5–6 mm. broad; petal membranous, shortly clawed, 2.5–3 cm. long or longer, the margin erose; ovary minutely velutinous, the elongate style puberulent only at base.—Allied by the author to *M. floridum* Karst. of Colombia with broader calyx-tube and shorter and broader calyx-lobes; 2–3 meters high, the calyx according to Tessmann yellow green, carmine within as also the flowers except the petal which is white above. F.M. Neg. 1548.

Loreto: Mouth of Santiago, flood-free wood, *Tessmann 4265*, type. Balsapuerto, *Klug 2863; 3046* (det. Standl.).

Macrolobium limbatum Spruce ex Benth. in Mart. Fl. Bras. 15, pt. 2: 218. 1870.

Slender tree glabrous even to the racemes, these short, solitary or more often fascicled at the leafless nodes and the flowers corymbosely crowded, the inflorescence then only a cm. or so long; leaflets 2, shortly petioled, long-oblong, oblique at base, bluntly short-pointed, sublustrous above, the prominent primary veins impressed and strongly confluent within the margin, 2 dm. long, 8 cm. wide or larger; pedicels 1.5–4 mm. long; bracts small, caducous; bractlets obovate, 5 mm. long; calyx-tube scarcely stipitate, the obtuse oblong membranous sepals 6 mm. long, the upper broader, exceeded by the petal claw, the crisped obovate petal blade about 5 mm. long; ovary glabrous or pilose, with 4 ovules.—Pod resembles that of *M. bifolium* (Ducke). The related and similar *M. canaliculatum* Spruce has smaller oval-oblong, very obtuse leaves, venation obscure. *M. palustre* Ducke has acute sepals shorter than the bractlets. Tree, 8 meters with white flowers, red stamens (Mexia). Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 56*.

Loreto: Mishuyacu, *Klug 663; 418*. Balsapuerto, *Klug 2867*. Near Yurimaguas, *Mexia 6088* (det. Standl.). Brazil. "Shimbillo."

Macrolobium machaerioides Killip & Macbr., spec. nov.

Arbor parva, ramulis novellis puberulentis; stipulis ovatis, acutis, 3 mm. longis; foliorum rachis dilatato-canaliculata, obscure pulverulenta et sparse ciliolata 12 cm. longa; foliolis 15–22 jugis oblongis, apice emarginatis, basi valde inaequilateris glabris subtus pallidis et venis mediocriter haud crebre prominentibus, 13–19 mm. longis, 6–7 mm. latis ad apicem paullo decrescentibus; racemis axillaribus, erectis vel patentibus, 2.5 cm. longis minutissime pulverulentis;

bracteis minutis; pedicellis circa 0.5 mm. longis; bracteolis minute strigillosis vix 4 mm. longis; calycis segmentis membranaceis valde reductis; petalum circa 6 mm. longum; ovarium stipitatum hirsutulum.—Apparently unique among species with many leaflets in character of calyx; otherwise perhaps nearest *M. venulosum* Benth. with leaflets mostly somewhat longer than 2 cm., their nervature dense, racemes reflexed, ovary glabrous. Tree 2 meters high with cream-colored flowers (Klug).

Loreto: Mishuyacu, *Klug 547* (type, U. S. Nat. Mus.).

Macrolobium microcalyx Ducke, Archiv. Jard. Bot. Rio Jan. 6: 624. 1933.

Glabrous, except the usually solitary axillary racemes, these finely tomentulose, 3–4 cm. long; leaf-rachis canaliculate with usually 4 (sometimes 3) pairs of oblong leaflets, the larger 5 cm. long, half as broad, obliquely inequilateral and obtuse at base, retuse at apex, thick but flexible, with many approximate very fine nerves, paler beneath; pedicels to 2 mm. long; bractlets 4–6 mm. long, oblong-acuminate, ashy puberulent at anthesis; calyx glabrous, the tube shorter than 1 mm., the segments minute, membranous; petal white, 7 or 8 mm. long; stamens purple, more than 1 cm. long, the filaments sparsely ciliate below; ovary stiped, white villous; pods (immature) glabrate, exceeding 10 cm. in length, 4 cm. in breadth.—Shrub or tree to 10 meters with white flowers.

Loreto: Mishuyacu, *Klug 140; 387; 1043* (all det. Killip). Brazil.

Macrolobium punctatum Spruce ex Benth. in Mart. Fl. Bras. 15, pt. 2: 219. 1870.

Glabrous throughout; leaflets 2, obliquely falcate-oblong, acuminate, more or less decurrent into petiolules 6–10 mm. long, lustrous, 8–15 cm. long, about 3 cm. wide; racemes many-flowered, open, the pedicels 2–3 mm. long; bractlets oblong, membranous, white, 8 mm. long; calyx-tube obliquely ovoid-oblong, 2 mm. long on stipe as long, the obtuse oblong segments 8 mm. long; petals white (Spruce), about 12 mm. long, obovate-rotund, contracted into a short biauriculate claw; ovary shortly stiped, glabrous; pod similar to that of *M. bifolium*.—Leaves in life according to Spruce pellucid-punctate. Tree 10 meters, the flowers yellow (Klug). *M. suaveolens* Spruce and *M. pendulum* Willd. of northern Brazil have subsessile leaflets, with unequal calyx segments, the racemes of the former dense, the bractlets obtuse, those of the latter loose, the bractlets very acute.

Loreto: Mishuyacu, *Klug 717* (det. Harms). Brazil.

Macrolobium stenocladum Harms, Notizbl. Bot. Gart. Berlin 9: 969. 1926.

Much like *M. ischnocalyx* but all parts smaller, the oblong lanceolate leaflets 4–10 cm. long, 2–4.5 cm. wide, the pedicels 2–3 cm. long, the bractlets 7 mm. long, the calyx-tube 4–6 mm. long, the pedicelliform part 2–3 mm. long; sepals oblong, 9–11 mm. long.—The type from a tree 10 meters high, the bractlets and calyx bright green, carmine striped within, the petals white except the base. F.M. Neg. 1552.

Loreto: Mouth of the Santiago, *Tessmann 4091*, type.

11. APULEIA Mart.

Apoleya Gleason, Phytologia 1: 143. 1935.

Smooth trees with unequally pinnate leaves, the leaflets alternate, coriaceous, and the small white often polygamous flowers borne in axillary cymules before the leaves are fully developed. Stipules as bracts minute or none, bractlets none. Calyx-tube shortly turbinate, the lobes 3, strongly imbricate. Petals 3, subsessile, oblong, narrowed at base, lightly imbricate, the stamens the same number (rarely 2) their filaments abruptly attenuate at tip, their anthers linear-oblong, basifixed, longitudinally dehiscent. Ovary shortly stiped, the stipe adnate, 2–3-ovuled, the style thickish with terminal truncate or dilated stigma. Pods obliquely ovate or oblong, plano-compressed, subcoriaceous, indehiscent, narrowly winged along upper suture. Seeds 1–2, transverse, ovate or orbicular, albuminous.

The generic name was originally written *Apuleja* Mart. Herb. Fl. Bras. 123. 1837, and is thus in conflict with *Apuleja* Gaertn. Fruct. 2: 439. 1791, which has resulted in Gleason, l.c., proposing a new name. He did this however when there was an international understanding that such cases should be submitted to a committee. In fact this case was so analyzed in Kew Bull. 360: 1935: "considering the fact that *Apuleja* Mart. is generally recognized while *Apuleja* Gaertn. is a synonym of the earlier *Berkheya* Ehrh. it seems advisable to conserve *Apuleja* Mart. with the accepted spelling *Apuleia*, since *i* and *j* in Latin do not constitute different letters though of different sound." Under the circumstances it seems improbable that *Apuleia* Mart. will not be conserved (and with the accepted spelling) especially in view of the fact that Gleason's action was taken at a time when he could have been informed that international agreement for the handling of such duplications in names had been arranged. A similar situation exists for *Martia*.

Apuleia leiocarpa (Vog.) Macbr. Contr. Gray Herb. 59: 23. 1919; 177. *Leptolobium*(?) *leiocarpum* Vog. Linnaea 11: 393. June–July 1837. *A. praecox* Mart. Herb. Fl. Bras. 123. Nov. 1837. *Apoleya leiocarpa* (Vog.) Gleason, Phytologia 1: 143. 1935.

Small tree or apparently sometimes at least 15 meters high with slender white lenticellate branchlets that at flowering time are quite leafless and then suggest somewhat *Dalbergia*, the flowers crowded in shortly villous cymes at the leaf-nodes and tips of short branchlets; expanding leaves lustrous-appressed-sericeous, especially the leaflets beneath, these 5–11 pairs, at maturity glabrous above, paler and at most minutely puberulent beneath or glabrous, reticulate-veined and lustrous at least above, ovate-lanceolate or oblong-elliptic, often somewhat acuminate but obtuse or even retuse, the larger 3–5 cm. long, about 2 cm. broad, distinctly petiolulate; pedicels 4–6 mm. long; calyx-tube scarcely 1 mm. long, the reflexed segments to nearly 4 mm. long; petals narrowed at base, somewhat shorter than the calyx; pods oval-suborbicular to 2.5 cm. long, about 12 mm. broad, the wing 0.5 mm. wide, the stipe rather long.—Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 46*.

Río Acre: Near mouth of Río Macauhán, *Krukoff 5542*. To Brazil and Argentina. "Garapo."

Apuleia molaris Spruce ex Benth. in Mart. Fl. Bras. 15, pt. 2: 177. 1870.

Distinguished from *A. leiocarpa* chiefly by the proportionately broader leaflets, these 5–9 pairs, mostly broadly elliptic or ovate-elliptic, finally 5–6 cm. long, 2.5–3 cm. wide or wider, obtusely and very shortly if at all acuminate, sometimes retuse; pods obliquely oblong, to 7 cm. long, 3 cm. broad, narrowed to the subsessile base, rounded at tip, the style lateral, the wing 2–3 mm. broad, finally glabrate.—Attains 30 meters or more, the bark smooth rusty brown; the very hard white and yellowish wood known as "ana" and used for the rollers for grinding sugar cane (Spruce); also excellent, according to Ducke, for canoes. F.M. Neg. 21796.

San Martín: Tarapoto, *Spruce 4881*, type.—Loreto: Yurimaguas, *Williams 4034*. Amazonian Brazil to Venezuela. "Muira-juba" or "pau mulato," "ana."

12. DIALIUM L.

Like *Apuleia* but cymes in axillary or terminal panicles, leaflets sometimes membranous, calyx-tube obsolete with 5 sepals, petals

1 or 2 or lacking, stamens usually only 2, the anthers oblong, ovary sessile or stiped, the ovate orbicular pod with 1 seed.—Ducke has found rarely 2 ovaries as in *Swartzia dicarpa, S. polyphylla,* exceptional however in the family.

Dialium guianense (Aubl.) Sandw. ex A. C. Smith, Lloydia 2: 184. 1939; 178. *Arouna guianensis* Aublet, Pl. Guian. 1: 16. *pl. 5.* 1775. *D. divaricatum* Vahl, Enum. 1: 302. 1805. *D. acuminatum* Spruce ex Williams, Field Mus. Bot. 15: 201. 1936.

Younger parts including the leaf-rachi, branchlet tips and panicles minutely rusty-hirsutulous, the cymes of the small flowers borne in a much-branched panicle rusty-appressed-sericeous; leaflets (3) 5–7 pairs, ovate or ovate-oblong, rounded at base or somewhat acute, more or less acuminate, 5–10 cm. long, about half as broad, densely reticulate-veined, rigid-chartaceous, the petiolules 3–4 mm. long; stipules small, promptly caducous; pedicels obsolete or rarely 2 mm. long; flowers scarcely 3 mm. long; petals none; pods obliquely egg-shaped, lightly compressed, to 18 mm. long, drying black, nearly glabrous with fragile exocarp, the pulp edible.—According to Williams who gives a good photograph, l.c. 201, of the tree, it frequently attains 25 meters, the crown spreading, the bark grayish or reddish-brown, the hard wood valued for posts on account of its resistance to moisture. There appears to be no consequential difference between the original form from Guiana and the Peruvian tree; Bentham saw none and Williams gives none. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 47.*

Loreto: Near Iquitos, *Williams 3699; Klug 1522.* Brazil to Guiana and Central America. "Huitillo," "jutai."

13. CASSIA L.

Reference: Benth. Trans. Linn. Soc. 27: 503–591. 1871.

Shrubs, less frequently herbs, with usually abruptly pinnate leaves (their stipules often conspicuous glands) and yellow, rarely red or white, bracted and bracteolate flowers borne in axillary or terminal racemes or panicles, rarely subsolitary. Calyx-tube disk-like, the segments imbricate as the petals, these subequal or the lower larger. Stamens 5 or 10, perfect or sometimes unequal and the upper smaller or 3 reduced, the basifixed anthers usually dehiscent from an apical cleft or pore or rarely dehiscent basally. Ovary sessile or stiped, many-ovuled. Pods terete or compressed, coriaceous or membranous, indehiscent or often 2-valved, sometimes longitudinally winged,

septate between the seeds or these surrounded with tissue. Seeds various, albuminous.

Ruiz & Pavón noted "hatumpacte" and "pachapacte" as names for two unidentified species of tarma used by the inhabitants "for a long time as purgatives, and the leaves are preferred to the senna leaves brought from Lima for the same purpose by the doctors." The pulp of the pods of *C. fistula* (and similar species) furnishes a laxative long employed in the preparation of cathartics but it is of interest that it is no longer included in the list of useful drugs compiled by the American Medical Association. The same species as well as *C. apoucouita* and a few others have extremely hard wood. Many species are extremely ornamental and their cultivation deserves more attention.

Cassia is one of the most natural genera in the family; to parcel it out into genera, as "herbarium botanists" do, can serve only to increase the number of authors' names as "new combinations" (Ducke). This succinct expression has my complete approval. There are three subgenera no member of which however approaches any other genus; that is, no member that is not clearly, to novice or professional, a Cassia; and even in the range of Peru, limited for a world-wide genus, there are species, as *C. Absus, C. apoucouita,* that combine characters assigned generic rank by many. Pittier, with perfect material, could not be sure that he was justified in placing in *Emelista* his *Emelista mucronulosa* Pitt. Journ. Wash. Acad. Sci. 19: 176. 1929. "Possibly," he wrote, "it should come somewhere in section *Chamaesenna* of the complex genus *Cassia.*" As it seems to be an interesting species it should indeed become **Cassia mucronulosa** (Pitt.) Macbr., comb. nov. . . , so that at least it may be possible to find it in herbaria.

In the few instances where synonymy or remark does not indicate relationship a sectional name has been noted. *C. florifera* Herrera, Contr. Fl. Cuzco ed. 2, pt. 1:121. 1921, has been unidentified, and the name, not accounted for in later editions of the same work, is doubtless to be dropped. Several Bolivian species, some possibly the same as those described here, have been published in Bull. N. Y. Bot. Gard. 4: 311. 1907 and 8: 94. 1912, but specimens were not seen.

Two keys follow, the second based largely on leaves.

Technical key (after Bentham, in part)

Anthers dissimilar, the 3 lower on elongate arcuate filaments, dehiscing by slits, the 7 upper on short filaments, basally

dehiscing, sometimes partly imperfect; pods indehiscent (Subgenus *Fistula*).

Bracts minute, caducous long before or at anthesis.

Leaflets ample, often 6 cm. wide, rather remote.

Petioles and pods terete.....*C. fistula.*

Petioles grooved above; pods somewhat flattened.

Petals entire, yellow with red veins; bracts 5–6 mm. long. *C. Spruceana.*

Petals white and rose or red; bracts 2–3 mm. long.

Bracts persisting to anthesis; petals white and rose, entire. *C. swartzioides.*

Bracts caducous before anthesis; petals red, 1 appendaged on claw.....*C. scarlatina.*

Leaflets oblong, smaller, crowded, 8–20 pairs.

Flowers bright yellow; anthers glabrous.....*C. leiandra.*

Flowers roseate or whitish; anthers pilose.....*C. grandis.*

Bracts persisting after anthesis.....*C. fastuosa.*

Anthers uniform or nearly unless in size (sometimes only 6 or 7 perfect), usually all apically dehiscent or sometimes laterally.

Perfect anthers 6 or 7 dehiscing by a pore or slit; pods indehiscent or if dehiscing not elastically (Subgenus *Senna*).

Leaves always with 2 pairs of leaflets, glandular (usually) at least between the lower pair, ample; pods dehiscing along interior suture.

Gland between both pairs of leaflets and obviously slender; stems angled.....*C. quinquangulata.*

Glands lacking or only between the first pair of leaflets, usually conical, or if between both pairs the lower gland conical, the upper slender; stems terete except *C. latifolia.*

Sepals strongly nerved and veined; petals puberulent only on nerves.....*C. macrophylla.*

Sepals more or less obscurely nerved; petals glabrous or evenly puberulent.

Petals 10–16 (20) mm. long; racemes axillary, often cauliflower.

Leaflets glabrous or essentially.

Peduncles short, the racemes corymbed or at the defoliate nodes; sepals firm.

Leaves long-acuminate; sepals oblong, 6 mm. long. *C. pallidifolia.*

Leaves if acuminate, shortly; sepals suborbicular, 3–4 mm. long. . . . . *C. Ruiziana.*

Peduncles more or less elongate; sepals membranous, 6–9 mm. long. . . . . *C. obliqua.*

Leaflets more or less pilose beneath; peduncles axillary. *C. loretensis.*

Petals 2–3 cm. long; racemes at least the principal terminal and usually corymbed.

Sepals and anthers both subequal.

Sepals oblong-ovate; stipules deciduous; leaves often pilose beneath. . . . . *C. fruticosa.*

Sepals suborbicular; stipules somewhat persisting; leaves glabrous. . . . . *C. latifolia.*

Sepals and anthers distinctly unequal. *C. Hoffmanseggii.*

Leaves usually with more than 2 pairs of leaflets, if only 2 pairs then small or medium.

Pods narrow, 3–6 (9) mm. wide, cylindric, subquadrate or sometimes compressed, often greatly elongate; stamens subequal or leaf-glands present (only in *C. spectabilis* glands lacking); cf. also *C. cushina,* pods unknown.

Leaflets obtuse or acutish; peduncles usually 2-flowered.

Leaflets obovate, medium or plants in part long-pilose.

Glabrous or pubescence appressed.

Anthers obtuse; pods usually subterete; seeds longitudinal. . . . . *C. Tora.*

Anthers beaked (in part); pods compressed; seeds oblique. . . . . *C. leiophylla.*

Pubescence widely spreading. . . . . *C. pilifera.*

Leaflets elliptic-oblong, small; anthers in part beaked; seeds transverse.

Leaflets, at least most leaves, 7 or more pairs. *C. biflora.*

Leaflets 3–4 pairs. . . . . *C. huancabambae.*

Leaflets distinctly acute or acuminate; peduncles several-flowered.

Leaflets 3–7 pairs, mostly with a gland near base of petiole.

Pods 2–3 (5) mm. broad; seeds oblique. . *C. leptocarpa.*

Pods 4–8 mm. broad; seeds transverse.

Leaves hirsute. . . . . *C. hirsuta.*

Leaves glabrous. . . . . *C. occidentalis.*

Leaflets 8–15 pairs; glands lacking (cf. *C. cushina*). *C. spectabilis.*

Pods at least 1 cm. wide (or thick), compressed to turgid-cylindrical; stamens often unequal, except *C. atomaria*, *C. Haughtii* with eglandular leaves.

Leaves usually with a gland at least between lowest leaflets, often small and if pubescent, softly.

Pods cylindrical or turgid, glabrous.

Leaflets glabrous.

Leaflets obtuse, broader above the middle. *C. bicapsularis.*

Leaflets more or less narrowed from the middle. *C. laevigata.*

Leaflets pilose beneath, 5–7 pairs. . . . . *C. aurantia.*

Pods strongly compressed (but more or less biconvex by the mature seeds) or if somewhat turgid, tomentulose.

Stipules not spinescent.

Anthers erostrate.

Leaflets 7–14 pairs.

Leaflets glabrous, acute to obtuse, usually lanceolate.

Filaments markedly unequal; pods somewhat stiped. . . . . *C. latopetiolata.*

Filaments not so unequal; pods subsessile. *C. Hookeriana.*

Leaflets usually pubescent at least on midnerve, obtuse, usually elliptic-oblong.

Pubescence a soft tomentum on the acutish leaflets beneath. . . . . *C. tomentosa.*

Pubescence lacking or not tomentose, the leaflets often rounded at tip.

Leaflets lightly pilose both sides, half as broad as long. . . . . *C. arequipensis.*

Leaflets glabrous above at maturity, usually more than half longer than broad.

Leaflets 8–12 pairs.

Leaflets oblong-elliptic, retuse or rounded.....*C. helveola.*

Leaflets slightly narrowed toward obtuse tips.....*C. birostris.*

Leaflets 3–4 pairs.....*C. Cookii.*

Leaflets 1–2 pairs.....*C. conjugata.*

Anthers rostrate.

Leaflets rather few (7–10 pairs).....*C. incarnata.*

Leaflets 20 pairs or more.....*C. multijuga.*

Stipules stoutly spinescent.....*C. spinescens.*

Leaves eglandular, glabrous or if pubescent, ample, or the pubescence rather coarse (*C. cushina* may have rudimentary gland).

Anthers equal, not rostrate.

Leaflets 3–6 pairs, ample, softly pilose beneath. *C. atomaria.*

Leaflets 8–15 pairs.

Leaflets glabrous; pods compressed.....*C. Haughtii.*

Leaflets puberulent; pods terete.....*C. spectabilis.*

Anthers unequal, in part aristate at base or rostrate.

Leaflets acute; longer anthers 6–7 mm. long.*C. lucens.*

Leaflets obtuse or longer anthers much longer.

Pods winged; leaflets glabrate; stipules persisting. *C. alata.*

Pods not winged; leaflets somewhat pubescent or if glabrous stipules caducous.

Leaflets pubescent beneath; stipules more or less persisting.....*C. reticulata.*

Leaflets completely glabrous unless on midnerve beneath or stipules caducous.

Leaflets prominently mucronate, rigid. *C. Pearcii.*

Leaflets scarcely mucronulate, membranous.

Peduncles hirtellous or glabrous.*C. cuspidata.*

Peduncles tomentulose.....*C. cushina.*

Perfect anthers 10 or by abortion fewer; pods elastically dehiscent (Subgenus *Lasiorhegma*).

Trees, the flowers cauliflower.....*C. apoucouita.*

Herbs or shrubs.

Viscid annual with small racemose flowers.....*C. Absus.*

Eviscid perennials or annuals, the flowers fewer, solitary in or above the axils (*Chamaecrista*); species minute or character obscure.

Flowers small, about 5 mm. long or scarcely longer, shortly peduncled.

Stems usually glabrous or puberulent; petiolar gland more or less stiped.....*C. Chamaecrista.*

Stems densely pilose; petiolar gland sessile..*C. patellaria.*

Flowers showy, 10 (8) –20 mm. long or longer, often borne on stalks as long or longer.

Flowering stems villous-pilose or hispidulous with spreading trichomes; petiole-gland usually more or less stiped.

Leaflets glabrous unless midnerve; stems hirsutulous; gland sessile.....*C. felipensis.*

Leaflets lightly pilose both sides; stems villous; gland subsessile or stiped.....*C. flavicoma.*

Flowering stems glabrous or the pubescence appressed or crisped.

Gland of petioles distinctly and slenderly stiped. *C. glandulosa.*

Gland of petioles sessile or subsessile or the stipe short, stout.

Leaflets mostly more than 10 pairs.

Leaflets 10–20 pairs.....*C. Pavoniana.*

Leaflets 20–40 pairs.....*C. Pennelliana.*

Leaflets mostly fewer than 10 pairs.

Gland sessile or subsessile; leaflets somewhat pilose.

Plants in part glabrate; pedicels about 15 mm. long or longer.

Pedicels filiform, lax.....*C. cuneata.*

Pedicels slender but erect.....*C. repens.*

Plants pubescent; pedicels about 8 mm. long. *C. brachypoda.*

Gland shortly stiped; leaflets glabrous or apparently.

Leaflets membranous; veins subreticulate; pedicels long..... *C. tenella.*

Leaflets fleshy; veins not reticulate, obscure; pedicels short..... *C. calvens.*

Key (based on leaves)

Peduncles in the upper axils only 1–2-flowered; leaflets usually cuneate-obovate, 2–3 (–4) pairs, never very small; pods never elastically dehiscent.

Leaflets usually wider than 1 cm., obovate or stem-pubescence spreading.

Pubescence lacking or appressed.

Larger sepals 6–8 mm. long; pods 2–3 mm. wide..... *C. Tora.*

Larger sepals often 10 mm. long or longer; pods 5–6 mm. wide. *C. leiophylla.*

Pubescence widely spreading..... *C. pilifera.*

Leaflets narrower than 1 cm.

Leaflets, at least most leaves, 7 or more pairs..... *C. biflora.*

Leaflets 3–4 pairs..... *C. huancabambae.*

Peduncles several-flowered or if flowers few or solitary in or above the axils, the leaflets many and very small or tiny and the pods elastically dehiscent (*C. conjugata,* if only 2-flowered, has peduncles in part terminal).

Leaflets 2 pairs and ample or wider than 1.5 cm.; perfect anthers or sepals subequal except *C. Hoffmanseggii.*

Gland between both pairs leaflets and obviously slender; stems angled..... *C. quinquangulata.*

Glands lacking or only between first pair leaflets, usually conical or if between both pairs the lower gland conical, the upper slender; stems terete except *C. latifolia.*

Sepals strongly nerved and veined; petals puberulent only on the nerve..... *C. macrophylla.*

Sepals more or less obscurely nerved; petals glabrous or evenly puberulent.

Petals 10–16 (20) mm. long; racemes axillary, often cauliflower.

Leaflets glabrous or essentially.

Peduncles short, the racemes corymbed or at the defoliate nodes; sepals firm.

Leaflets long-acuminate; sepals oblong, 6 mm. long. *C. pallidifolia.*

Leaflets if acuminate shortly; sepals suborbicular, 3–4 mm. long..... *C. Ruiziana.*

Peduncles elongate; sepals membranous, 6–9 mm. long. *C. obliqua.*

Leaflets more or less pilose beneath; peduncles axillary. *C. loretensis.*

Petals 2–3 cm. long; racemes, at least principal, terminal and usually corymbed.

Sepals and anthers both subequal.

Sepals oblong-ovate; stipules deciduous; leaves often pilose beneath..... *C. fruticosa.*

Sepals suborbicular; stipules more or less persisting; leaves glabrous..... *C. latifolia.*

Sepals and anthers both distinctly unequal. *C. Hoffmanseggii.*

Leaflets with usually more than 2 pairs, if only 2 then small or medium.

Leaflets few or sometimes many but not very small nor the flowers solitary or few in most axils; pods rarely elastically dehiscing.

Stamens very unequal in length, the lower 3 with elongate arcuate and diverse anthers; leaflets if few somewhat pointed and coriaceous.

Bracts minute, caducous long before or at anthesis.

Leaflets ample, often 6 cm. wide, rather remote.

Petioles and pods terete..... *C. fistula.*

Petioles grooved above; pods somewhat flattened.

Bracts persisting to anthesis; petals not yellow. *C. swartzioides.*

Bracts caducous; petals red or yellow.

Petals red, 1 appendaged on claw.... *C. scarlatina.*

Petals yellow, unappendaged.....*C. Spruceana.*

Leaflets oblong, small, crowded, 8–20 pairs.

Flowers roseate or whitish; anthers glabrous. *C. leiandra.*

Flowers bright yellow; anthers puberulent..*C. grandis.*

Bracts persisting after anthesis.....*C. fastuosa.*

Stamens, if unequal, not extremely so; leaflets 7–many or if fewer obtuse or membranous.

Inflorescence cauliflower; anthers 10, laterally dehiscent; pods bivalved.....*C. apoucouita.*

Inflorescence axillary and terminal; characters, at least in part, otherwise.

Leaflets obtuse or rounded apically.

Glabrous shrubs.

Leaflets 3–5 pairs.....*C. bicapsularis.*

Leaflets 1–2 pairs.....*C. conjugata.*

Viscid annual.....*C. Absus.*

Leaflets acute to acuminate.

Leaflets 2–2.5 cm. wide, glabrous to hirsute, with 1 or more glands between them.

Leaflets 3–4 pairs, usually with a gland between each pair; pods subcylindrical.....*C. laevigata.*

Leaflets (3) 4–7 pairs, the leaf with only a gland at base; pods flat.

Pods 3 (5) mm. wide, the seeds oblique; plants glabrate to lightly hirsute.....*C. leptocarpa.*

Pods 5–9 mm. wide, the seeds transverse.

Plants densely hirsute.....*C. hirsuta.*

Plants glabrous or nearly.....*C. occidentalis.*

Leaflets 3–6 cm. wide, pilose beneath, the leaf eglandular.....*C. atomaria.*

Leaflets often or mostly 7–many pairs, sometimes tiny, always if few, and the flowers then solitary or axillary, the pods elastically dehiscent.

Leaflets medium, mostly or all much wider than 3 mm.; peduncles many-flowered; pods indehiscent or the valves not elastic.

Leaflets retuse, rounded or obtuse, ordinarily more or less pubescent or the longer anthers beaked.

Leaflets 7–15 cm. long, 2–7 cm. wide.

Plants somewhat pubescent; pods not winged. *C. reticulata.*

Plants glabrous or glabrate; pods winged. . . . . *C. alata.*

Leaflets all or mostly smaller.

Leaflets medium, (2.5) 3–7 cm. long or sometimes shorter but then 20 or more pairs.

Leaflets about 20 or more pairs. . . . . *C. multijuga.*

Leaflets fewer.

Racemes usually hirteilous; leaflets membranous. *C. picta, C. cuspidata.*

Racemes glabrous; leaflets rigid, mucronate. *C. Pearcii.*

Leaflets small, mostly 1.5–2.5 (3) cm. long, rarely if ever as many as 15 pairs.

Leaves with usually 1 or more glands between the leaflets; anthers unequal.

Leaf-rachis sparsely pilose or glabrous, the leaflets partly glabrate.

Longer anthers beaked. . . . . *C. incarnata.*

All the anthers blunt.

Leaflets slightly narrowed to obtuse tips. *C. birostris.*

Leaflets oblong-elliptic, retuse or rounded. *C. helveola.*

Leaf-rachis densely pubescent or in any case leaflets lightly pilose both sides or densely beneath.

Leaflets densely tomentose or pilose beneath.

Gland usually 1; pods glabrous, terete. *C. aurantia.*

Glands usually several; pods subcompressed, tomentose. . . . . *C. tomentosa.*

Leaflets lightly pilose both sides. *C. arequipensis.*

Leaflets lightly pilose only beneath. . *C. Cookii.*

Leaves without glands, glabrous; anthers equal. *C. Haughtii.*

Leaflets acute to acuminate or if rarely obtusish glabrous and the longer anthers obtuse or merely cusped (cf. *C. Haughtii*).

Flowers showy, the petals to 2.5 cm. long; stipules spinescent. . . . . *C. spinescens.*

Flowers medium in size, the petals 1–1.5 cm. long; stipules not spinescent.

Leaflets less than 1.5 cm. wide, glabrous.

Leaflets acutish; filaments unequal; pods more or less stiped. . . . . *C. latopetiolata.*

Leaflets obtusish; filaments subequal; pods subsessile. . . . . *C. Hookeriana.*

Leaflets 1.5–2 cm. wide, somewhat pubescent.

Leaflets minutely or sparsely pubescent beneath; stamens unequal, forked at base or beaked.

Leaflets 8–10 pairs; sepals and larger anthers 7–10 mm. long; pods flat. . . . . *C. lucens.*

Leaflets 10–15 pairs; sepals and larger anthers 10–12 mm. long.

Petioles and peduncles yellowish-tomentulose; leaflets sparsely pilose beneath. *C. cushina.*

Petioles and peduncles glabrous or hispidulous; leaflets glabrous beneath except midnerve. *C. cuspidata.*

Leaflets pubescent beneath; stamens subequal, obtuse; pods terete. . . . . *C. spectabilis.*

Leaflets small or tiny, rarely more than 3 mm. wide; flowers solitary or few, axillary or supra-axillary; pods elastically dehiscent; low shrubs or herbs (*Chamaecrista;* see end of technical key, p. 149).

Cassia Absus L. Sp. Pl. 376. 1753; 558. *Grimaldia Absus* (L.) Britton & Rose, N. Amer. Fl. 23: 299. 1930.

Erect somewhat branching annual often several dm. high, the stems and petioles more or less stiffly viscid-pubescent; leaflets 2 pairs, obliquely elliptic, membranous, puberulent beneath, 2–4.5 cm. long; flowers 5–7 mm. long, in terminal racemes; stamens 5 (7);

pods sparsely hispid, 2.5–4 cm. long, 6–7 mm. broad.—Section *Absus*. Illustrated, Basu, Ind. Med. Pl. *pl. 357*.

Piura: Serrán, *Weberbauer 5992*. Warm regions.

Cassia alata L. Sp. Pl. 1378. 1753; 550. *Herpetica alata* (L.) Raf. Sylv. Tellur. 123. 1838.

Similar to *C. reticulata;* leaflets 6–12 pairs, sometimes retuse, broadly rounded or truncate at base, often puberulent beneath, 5–15 cm. long, 3–7 cm. broad; sepals 1 cm. long; pods medially winged longitudinally, membranous except for the thickened margins.—Illustrated, Degener, Fl. Hawaii.; Contr. U. S. Nat. Herb. 8: *pl. 39* (photo).

Peru (probably, at least in cultivation). Warm regions of America, Asia and Africa.

Cassia apoucouita Aublet, Pl. Guian. 379. *pl. 146*. 1775; 557.

Tree, glabrous except for the short rusty puberulent densely flowered racemes that are borne often abundantly on the older portion of the branchlets just beneath the glossy foliage; leaflets 2–6 pairs, oblong or ovate-elliptic, rounded or shortly cuneate at base, more or less acuminate, usually only slightly oblique, firm-membranous, conspicuously reticulate-veined both sides, very variable in size, sometimes on flowering branchlets only 3–4 cm. long, about half as wide, usually 10–12 cm. long or longer, 3–4.5 cm. wide or wider; glands variously developed, rarely none; bracts minute, caducous; pedicels soon 2–2.5 cm. long; calyx segments 4–6 cm. long; petals broadly obovate, shortly clawed, 12–18 mm. long; stamens 10, subsessile, subequal, the thick puberulent anthers 4–6 mm. long, the cells dehiscing by short vertical slits; ovary glabrous or nearly; pods plane, shortly and obliquely acuminate, lustrous, elastically dehiscing by the enlarged nerviform sutures, 1–2 dm. long to 2.5 cm. broad.—Species of interest, as with *C. Absus* it forms a transition in the fruit toward Subgenus *Chamaecrista*. Related Brazilian species include *C. hymenaeifolia* and *C. adiantifolia*, the former with 1–3 pairs of coriaceous leaflets, paler beneath and closely subparallel-veined; the latter with 20–30 pairs of obtuse strongly oblique leaflets, tomentose beneath.—Section *Apoucouita*. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 40*.

Piura: Chipillicos and Hacienda Tina (*Raimondi*, det. Dahlem as affine). Brazil to Guiana.

Cassia arequipensis Meyen ex Vog. Syn. Cass. 43. 1837; 539.

Shrub, the densely leafy branchlets and leaves pilose-puberulent, the subappressed trichomes lustrous; stipules subulate, deciduous; leaf glands very minute; leaflets 6–14 pairs, subsessile, oblong-elliptic, rounded at both ends, 7–10 mm. long, 4 mm. broad; racemes little exceeding the leaves, the pedicels 12–22 mm. long; bracts oblong-linear to 6 mm. long, caducous; petals about 10 mm. long; stamens 10, the anthers erostrate but the fertile bluntly cusped, the filament of the two larger to 7 mm. long, equaling the petals; ovary with its stipe pubescent, the style glabrous.—Section *Chamaesenna*. F.M. Neg. 1648.

Arequipa: Near Arequipa, *Meyen*, type; rocky banks, 3,100 meters, *Pennell 14278; 13238; Goodspeed 22106*.

Cassia atomaria L. Mant. 68. 1767; 548. *C. laeta* HBK. Nov. Gen. & Sp. 6: 340. 1824. *Cathartocarpus laetus* G. Don, Gen. Syst. 2: 454. 1832. *Cassia Weberbaueri* Macbr. Field Mus. Bot. 8: 92. 1930.

Densely leafy shrub or tree sometimes 10 meters high; leaflets 4–5 pairs, oblong-ovate-lanceolate, 7–12 cm. long, 3–5 cm. broad, rounded at base, acuminate, membranous, sparsely puberulent and somewhat lustrous above, softly pilose beneath, nearly concolor, eglandular; racemes axillary, to 1.5 dm. long, much shorter than the leaves, very laxly flowered, the slender pedicels to 2.5 cm. long; sepals puberulent, membranous, oval, the larger inner ones about 5 mm. long; petals unequal, the larger 1.5 cm. long, fertile stamens usually 7, subequal, merely cusped; pods compressed to 4.5 dm. long, 16 mm. broad, the seeds transverse.—In Candollea 6: 9. 1934, I reduced my species because apparently a collection from the type locality, Guayaquil, of *C. laeta* has a similar pod, not originally described; however, it seems to me questionable if the plant of HBK. can be distinguished from *C. atomaria*. *C. emarginata* L., closely allied, has smaller leaflets, very obtuse or rounded apically. Section *Chamaesenna*.

Tumbez: Rainy green formation, 200 meters, *Weberbauer 7709* (type, *C. Weberbaueri*).—Piura: Talara, *Haught 61*. To Mexico.

Cassia aurantia Ruiz & Pavón ex G. Don, Gen. Syst. 2: 441. 1832; 541. *C. Dombeyana* Vog. Syn. Cas. 28. 1837.

Shrub usually less than a meter high, sprawling or forming clumps, the branches spreading, the younger as the leaves and peduncles more or less pilose-puberulent; stipules setaceous, caducous; leaflets

5–7 pairs, the lower with a slender gland between them, oblong-elliptic, rounded at both ends or usually oblique at base, commonly 2–3 cm. long, 8–12 mm. broad; peduncles axillary, elongating, the flowering portion slightly exceeding the subtending leaf, the lower pedicels 1.5–2 cm. long; sepals very unequal, the suborbicular inner ones 6–7 mm. long; petals about 10 mm. long; anthers merely cusped, two with elongate filaments and slightly exserted; pods shortly stiped, cylindrical, to 8 cm. long, about 8 mm. thick, glabrous or nearly.—Usually on stony slopes or stream flats. *C. indecora* HBK., Nov. Gen. & Sp. 6: 344. 1824, to which this has been referred, has subcompressed puberulent pods, oblong-obovate leaflets. Section *Chamaesenna*. F.M. Negs. 1654; 28000.

Lima: Above Obrajillo, 3,100 meters, *Pennell 14424*.—Junín: Tarma, *1033;* 3,100 meters, *Killip & Smith 21811;* (Weberbauer, 176). Huacapistana, *Killip & Smith 24264*. Puerto Yessup, *2629*.—Huánuco: Without locality, *Dombey; Ruiz & Pavón*, type. Ambo, *3194*. Maria del Valle, *3559*. Chulki, *Sawada P60*.

Cassia bicapsularis L. Sp. Pl. 538. 1753; 525. *C. limensis* Lam. Encycl. Suppl. 1: 643. 1783. *C. alcaparillo* HBK. Nov. Gen. & Sp. 355. 1824. *C. Augusti* Harms, Repert. Sp. Nov. 18: 93. 1922. *Adipera bicapsularis* (L.) Britton & Rose in Britton & Wilson, Surv. Porto Rico 5: 370. 1924.

Erect glabrous shrub, ordinarily 2–3 meters high, the leaves typically with 3–5 pairs of oblong-elliptic or slightly obovate leaflets with usually a clavate gland between the lowest pair; leaflets 1.5–3.5 cm. long, 12–15 mm. broad; uppermost racemes often panicled, the pedicels 5–10 mm. long; calyx usually about 8 mm. long, the petals a third to half again as long; perfect stamens usually 7, 2 filaments much elongate; pods stiped, subcylindrical or slightly inflated, straight or nearly, 4–15 cm. long, 1–1.5 cm. thick.—Since some specimens of *C. bicapsularis*, for example, my *2320*, have at least some of the branches with only 2 pairs of leaflets, it seems preferable to treat *C. Augusti* as a variety, var. **Augusti** (Harms) Macbr., comb. nov. (*C. Augusti* Harms, l.c.). In Inca the plant is called "bejuco" and the flexible branches are used to make canastras (Raimondi). Illustrated, Rock, Leg. Pl. Hawaii, *pl. 35*.

Piura: Olleros, *Bonpland*, (type, *C. alcaparillo*).—Ancash: Huarmey, *Vargas 1225*. Tambo del Pariocota, *2542*. Santa, (*Raimondi*, det. Dahlem, *C. Augusti*).—Amazonas: *Mathews 3276*.—Huánuco: Huacho, 6-meter tree, *Stork & Horton 9399* (det. Standl.).

Huánuco, *2320.*—Junín: Sprawling shrub in thicket, sandy valley, La Merced, *5477* (det. Rose). Tabina, *Weberbauer 2030;* 248.—Loreto: Caballo-Cocha, *Williams 2335; 2499.*—Ica: Below Pampano, *Weberbauer 5368* (type, *C. Augusti*). Without locality, (*Raimondi*, det. Dahlem, *C. Augusti*). Warm America. "Alcaparillo," "alpaquilla."

Cassia biflora L. Sp. Pl. 540. 1753; 543. *C. nemorosa* HBK. Nov. Gen. & Sp. 6: 353. 1824. *Peiranisia biflora* (L.) Pitt. Trab. Mus. Com. Venez. 3: 158. 1928.

Slenderly branched shrub, sometimes 3 or 4 meters high, glabrate or the peduncles and younger leaves more or less pilose-puberulent; leaflets ordinarily 7–10 pairs, the gland between the lowest pair (sometimes a gland between the two lowest pairs) cylindrical, often stipitate; leaflets elliptic, obtuse, very variable in size, usually 1.5–3.5 cm. long and about half as broad; flowers 2 (4), the slender peduncle 2–3.5 cm. long, the pedicels about 1.5 cm. long, these bracteolate at base; sepals and petals unequal, the former 5–8 mm. long, the latter 1–2 cm. long; 3 larger stamens rostrate, the 3 or 4 smaller, cusped; pods shortly stiped, usually somewhat falcate, compressed, bivalvate, 7–15 cm. long, 4–8 mm. broad.—In Ayacucho the leaves are used in fumigation (Raimondi). Section *Chamaesenna.* Illustrated, Bot. Reg. 16: *pl. 1310.*

Cajamarca: Valley Río Shumba, 700 meters, *Weberbauer 6173;* (*Raimondi*). Jaén de Bracamoros, *Bonpland* (type, *C. nemorosa*). Cacas, *Raimondi.*—Lima: Atacongo, sprawling shrub 1 meter high, arid hills, *Mexia 04039* (det. Johnst.).—Ancash: Near Mato, *Raimondi.*—Ayacucho: *Raimondi.* South America to the West Indies. "Pichana," "motay."

Cassia birostris Dombey ex Vog. Syn. Cass. 43. 1837; 540. *Chamaefistula birostris* Dombey ex Vog. Linnaea 11: 685. 1837.

Allied to *C. arequipensis* but the leaflets slightly narrowed to the obtuse or acutish tips, glabrate or sparsely pilose on the midnerve beneath, 8 or 9 pairs, the leaf gland below the lower pair, well developed and stiped; pedicels 8–10 mm. long; petals about 10 mm. long; stamens of *C. arequipensis.*—It is probable that the character of this species should be broadened to include *C. helveola* and perhaps *C. arequipensis;* the fruit however is not known and the pubescence is much sparser, the glands different, the leaflets fewer and somewhat diverse in shape. F.M. Neg. 1657.

Lima: Cheuchín, *Dombey*, type.—Amazonas: Chiquibamba, (*Raimondi*, det. herb. Dahlem with query).

Cassia brachypoda Benth. in Mart. Fl. Bras. 15, pt. 2: 172. 1870; 575.

Similar to *C. patellaria* but the leaflets only 6–10 pairs, oblong, 12–25 mm. long, pinnately veined from the subcentral midnerve; sepals 8–10 mm. long, little exceeded by the larger petals; stamens very unequal.—Bentham describes with query a var. *multijuga* with as many as 15 pairs of mucronate leaflets, the midnerve more excentric, the stipules smaller. He also suggests and probably rightly that the earlier name is *C. vestita* Vog. Syn. Cass. 60. 1837; Linnaea 11: 711. 1837, remarking that "it agrees with *C. brachypoda* in every respect except that the gland is said to be urceolate and shortly stipitate." F.M. Neg. 1663 (*C. vestita*).

San Martín: Lamas, (*Spruce*, det. Benth.). Bolivia; Brazil.

Cassia calvens Macbr., spec. nov.

Suffrutex, humilis, parum ramosus; caulibus adscendentibus circa 1 dm. altis minutissime puberulis; stipulis anguste lanceolatis vix 2 mm. longis; foliolis 4–6 jugis, paullo oblique obovatis, apice rotundato-truncatis vix mucronulatis, ad 8 mm. longis, 4 mm. latis, e costa parum excentrica obscure penniveniis, coriaceis, opacis, subtus obscurissime pulverulentis, glandula parva breviter stipitata; pedicellis circa 5 mm. longis; sepalis membranaceis ad 7 mm. longis; petalis ad 12 mm. longis; leguminibus suberectis, puberulis.—Affinity not determined, but apparently to be sought in series *Subcoriaceae* of section *Chamaecrista*.

Peru: Specimen in Field Museum without data, *Weberbauer 5496*, type.

Cassia Chamaecrista L. Sp. Pl. 542. 1753; 576. *Chamaecrista Chamaecrista* (L.) Britton, Bull. Torrey Club 44: 12. 1917.

Herbaceous or more or less suffrutescent below, apparently sometimes erect and 1 to several dm. high, glabrous or pubescent; leaflets 8–20 pairs, narrowly oblong, obtuse or acutish, membranous, pinnately veined, the midnerve little excentric, usually about 12 mm. long, 2 mm. broad, ordinarily lightly puberulent beneath or on both sides; gland shortly stiped; pedicels short or about as long as the petioles; stipules linear-setaceous, striate; sepals acutely acuminate, 4–5 mm. long, the petals about as long; pods to about

4 cm. long, 3–4 mm. broad.—The Haught specimen was at one time referred to *C. riparia* HBK. of Colombia, erect, with 16–19 pairs of leaflets and, if distinct, may be that species, the type in fruit, its pods 4 mm. broad. *C. stenocarpa* Vog. seems to be another form most like *C. riparia* but the stems spreading pilose; Bentham, 577, suggested that both these species ought probably to be united with *C. glandulosa*. They seem to be doubtfully distinct from *C. Chamaecrista* which, according to Britton & Rose, is confined to the West Indies, Mexico and Colombia and includes only low herbaceous plants; cf. Britton & Pennell, Bull. Torrey Club 44: 12 & 348. 1917, who first pointed out that the name should apply to a species with stiped gland. *C. mimosoides* L., sometimes confused, is actually Asiatic, with short-cupulate gland, minute leaflets.

Piura: Pariñas Valley, *Haught F6*.—Cajamarca: Cayacati, (*Raimondi*).—Lima: Río Rimac, (*Raimondi*). Warm America.

Cassia conjugata R. & P. ex Benth. Trans. Linn. Soc. 27: 540. 1871.

Glabrous glaucous shrub, the leaves with only 1–2 pairs of broadly elliptic or slightly obovate, very obtuse leaflets and upper axillary few-flowered racemes; leaflets sometimes with a few short trichomes beneath, nearly veinless, about 2 cm. long and half as broad, with a slender or stipitate shortly conical gland between the single or lower pair; pedicels only 2–4, 6–16 mm. long; sepals very unequal, the orbiculate inner 4–6 mm. long; larger petals about 10 mm. long, the veins more deeply colored; larger anthers with elongate filaments, all erostrate; pods plane, membranous, slightly arcuate, 5–7.5 cm. long, 10–12 mm. broad.—Low or spreading, the leaves fleshy. Section *Chamaesenna*. F.M. Neg. 1676.

Ayacucho: Río de Lomas and Río Yauca, *Weberbauer 5756*.—Arequipa: Atiquipa, (*Raimondi*); *Goodspeed 15635* (det. Johnst.).—Ica: Tinque, (*Raimondi*). Without locality, *Ruiz & Pavón*. Bolivia.

Cassia Cookii Killip & Macbr., spec. nov.

Fruticosa, foliolis exceptis glabra stipulis caduceis; foliolis 3–4 jugis (glandula conica inter inferioribus) suboblique oblongo-ellipticis basi inaequilateralis, apice late rotundatis vel minute retusis circa 2.5 cm. longis, 12 mm. latis vel interdum demum 4 cm. longis circa 2 cm. latis, supra glabris, subtus laxe pilosis; racemis ad apices ramorum paniculatis ad 1 dm. longis plus minusve recurvatis laxifloris; bracteis caducissimis; pedicellis gracilibus 2–2.5 cm. longis;

sepalis oblongo-obovatis membranaceis coloratis circa 7 mm. longis; petalis late obovatis ad 13 mm. longis; antheris apice cupuliferis erostratis 2 longe stipitatis; leguminibus compressis, glabris, curvatis circa 1.5 dm. longis, 1.5 cm. latis.—Apparently a very distinct species among a group of closely related forms centering perhaps about *C. birostris.*

Cuzco: San Miguel, Urubamba Valley, *Cook & Gilbert 1747* (type, U. S. Nat. Mus.).

Cassia cuneata DC. in Collad. Hist. Cass. 121. 1816; 575.

Habit and stipules of *C. repens;* leaflets 4–6 pairs, oblong-cuneate, 12 mm. long, about 4 mm. broad, glabrous above, pubescent beneath, lineately pinnate-veined, the midnerve subcentral, often also with 1–2 lateral nerves from the base; gland subsessile; pedicels 1–3, about 12 mm. long, pubescent; sepals long, acuminate; petals about 10 mm. long.—Description after Bentham, who probably rightly suggests that this is an earlier name for *C. repens.* Known only from the type, without data. F.M. Neg. 7004.

Peru (possibly; cf. note above).

Cassia cushina Macbr., nom. nov. *C. andina* Rose ex Macbr. Field Mus. Bot. 8: 93. 1930, not Philippi.

Tree, the branchlet tips, leaf-rachi and peduncles densely yellowish-tomentose; leaves 3 dm. long (probably longer) with 10–14 (or more) oblong-lanceolate leaflets, these, at least on the type in flower, membranous, reticulate-veined both sides, glabrous above, sparsely subappressed-pilose beneath, slightly oblique at the rounded base, acutely acuminate, the middle ones about 7 cm. long, 2 cm. broad; racemes axillary in the uppermost leaves, about a third as long, floriferous only toward the tips; pedicels glabrous, recurving after anthesis, about 1.5 cm. long; calyx divisions subequal, 10–12 mm. long, glabrous; petals to 15 mm. long, obovate, narrowly clawed, strongly veined, bright yellow; filaments subequal; larger anthers arcuate, 10–12 mm. long, the cells acuminately divaricate at base, finally longitudinally dehiscent, the smaller anthers 5 mm. long; ovary stiped, glabrate, the arcuate style glabrous.—The type was from a forest tree about 6 meters high with open crown. Since there is a *C. Rosei* I have devised the name. *C. pistaciaefolia* HBK. Nov. Gen. & Sp. 6: 349. 1824, of Ecuador and Colombia has elongating racemes, short pedicels and leaflets with looser pubescence beneath.

Huánuco: Cushi, *4825,* type.

Cassia cuspidata Willd. Enum. Hort. Berol. 443. 1809; 551. *C. fraxinifolia* HBK. Nov. Gen. & Sp. 6: 349. 1824. *C. pistaciaefolia* var. *glabra* Benth. l.c.

Glabrous, except for the evanescently hispidulous branchlet tips, racemes before anthesis and leaflets beneath along the midnerve; leaflets nearly oblong, slightly oblique and rounded at base, obtuse or rounded at apex, obscurely or very shortly mucronulate, ordinarily about 6 cm. long, 18 mm. broad, membranous, light green, paler beneath, reticulate-veined, glands none; racemes axillary, sometimes branched, elongating to 2 dm.; pedicels 8–10 mm. long; calyx glabrous, the elliptic divisions somewhat colored, about 12 mm. long; petals shortly clawed, conspicuously nerved, yellow, to nearly 2 cm. long; anthers erostrate, the larger aristate at base, arcuate, 10–12 mm. long; ovary shortly stiped, glabrous; pods compressed, smooth, the sutures little enlarged, 7–10 cm. long, about 1.5 cm. broad, the seeds oblong-linear.—Near *C. pistaciaefolia* HBK. of Colombia (cf. note under *C. cushina*) and treated by Bentham, 551, as var. *glabra* of that species but unless intermediates are found it is probably distinct, the leaflets of all the Colombian specimens seen being fewer, broader and pubescent and especially, they have elongating racemes, the pedicels much shorter than the calyces. The name of Willdenow is taken up on the basis of Bentham's identification (without question) but it is not apt. Cf. *C. picta*. Section *Chamaesenna*. F.M. Neg. 1731.

Cajamarca: Bracamoros, *Bonpland*, type. River bank west of Socota, 2,800 meters, shrub to 2.5 meters, *Stork & Horton 10101* (det. Standl. *C. Pearcii* Benth.). Nancho, Sipian, and Cayacati, (*Raimondi*, det. Dahlem as *C. pistaciaefolia*). "Mutuy grande."

Cassia fastuosa Willd. ex Vog. Linnaea 11: 654. 1837; 516.

Tree sometimes 15 meters high, the branchlets, petioles and long inflorescences minutely and sparsely puberulent or glabrate; stipules semiovate, sagittate, caducous; leaflets 10–20 (25) pairs, oblong, obliquely truncate or rounded at base, acute, 2.5–5 cm. long, about 15 mm. wide, membranous, glabrous and lustrous above at least in age, somewhat ashy-puberulent or glabrate beneath; racemes at the leafless nodes of older branches, lax, simple or branched, often 3 dm. long; bracts ovate-lanceolate, acuminate, mostly persisting at anthesis; pedicels 2.5–3.5 cm. long; calyx segments oblong-ovate, obtuse, 10 mm. long, petals obovate, about 3 cm. long, slenderly clawed; stamens glabrous, the three larger about as long as the petals,

their filaments medially arcuate, their anthers oval-oblong, the longitudinally dehiscent cells acuminately divaricate at base, the 7 remaining anthers with straight filaments about half as long as the petals, the 4 larger dehiscing basally from pores; ovary sericeous tomentose; pods fleshy, minutely and sparsely tomentulose, subquadrate by the broad obtuse sutures, 10 mm. broad, septate within, between the transverse seeds.—According to Ducke sometimes cultivated for the beautiful pendent inflorescences of large yellow flowers. Cf. *C. javanica* L. under *C. fistula*. F.M. Neg. 1687.

Río Acre: Antimary, fide Ducke. Amazonian Brazil.

Cassia felipensis HBK. Nov. Gen. & Sp. 6: 368. 1824; 576.

Branchlets hirsute-tomentose; leaflets about 12 pairs, little inequilateral, linear-oblong, acutish, obliquely cordate at base, lineately veined, membranous, glabrous or slightly ciliolate and pilose on the midnerve beneath, the larger 12–14 mm. long, 3 mm. broad; gland small, sessile, cupulate; stipules lanceolate-subulate, ciliate, 8 mm. long; peduncles solitary or geminate, bibracteolate, filiform, pubescent, 2 cm. long, with 2 ovate acuminate bracts at their tips; calyx-lobes oblong-lanceolate acuminate, pubescent without, exceeded by the larger clawed petals, these about 10 mm. long; ovary sericeous-pilose.—Bentham, l.c., included this apparently with doubt in his interpretation of *C. Chamaecrista*.

Cajamarca: San Felipe, Prov. Jaén de Bracamoros, (*Bonpland*, type).

Cassia fistula L. Sp. Pl. 540. 1753; 514.

Beautiful tree ordinarily rather low, sometimes 15 meters high, with the flowers of *C. fastuosa*, but the bracts caducous before anthesis, the stipules minute, and the leaflets 4–8 pairs, broadly ovate or elliptic, obtuse or acutish, rounded or shortly cuneate at base, glabrous or nearly so, conspicuously reticulate and closely parallel-veined both sides, 7–10 cm. long or longer; pods pendent, 3–6 dm. long, 1.5–2 cm. thick, cylindrical, smooth, the pulp pleasantly sweet.

This, the "Golden Shower" in cultivation, is a native of tropical Asia, and is a source of "cassia" (extracted from the pulp of the pods), an active ingredient of many purgatives; the heart-wood is extremely hard. The white and pink flowered *C. javanica* L. (which according to Degener sometimes hybridizes with *C. fistula*) has short erect inflorescences with persisting bracts and smaller oblong-oval leaflets. Both species illustrated, Degener, Fl. Hawaii.

Cajamarca: Marañón Valley, in river thickets, (Weberbauer, 155). Tropical Asia.

Cassia flavicoma HBK. Nov. Gen. & Sp. 6: 366. 1824; 576. *C. stipulata* G. Don, Gen. Syst. 2: 448. 1832. *Chamaecrista flavicoma* (HBK.) Greene, Pittonia 4: 32. 1899.

Slender-stemmed shrub a meter or more high, the branchlets densely and softly yellowish-villous with spreading trichomes, this pubescence extending in some degree to the leaf-rachi, slender peduncles and young pods; leaflets about 12–16 pairs, oblong, typically somewhat pubescent both sides, sometimes glabrous, oblique at base, rounded or truncate but mucronate at apex, 1–2 cm. long, 3.5–6 mm. broad, the midnerve moderately excentric, closely lineate-veined both sides; gland stipitate; stipules lanceolate, acuminate, striate, conspicuously persisting; peduncles solitary or geminate, bracteate, filiform; calyx somewhat pilose, the scariosely margined divisions 10–12 mm. long, slightly exceeded by the shortly clawed petals; pods lightly pilose, 6 cm. long, 6 mm. broad.—Type from the Orinoco River. F.M. Neg. 1688.

Huánuco: Chinchao, *Raimondi; Ruiz & Pavón* (probably, type *C. stipulata*). Yanano, open shrub, 1 meter, sunny slopes, *3813* (det. Rose, *C. stipulata*).—Junín: Palca, (Weberbauer, 248).—Ayacucho: Near Río Apurímac, 600 meters, *Weberbauer 5633; Killip & Smith 22315; 23223*.—Cuzco: Machu-picchu, *Soukup 145*. Venezuela.

Cassia fruticosa Mill. Gard. Dict. ed. 8. no. 10. 1768; 521. *Chamaefistula fruticosa* (Mill.) Pittier in Trab. Mus. Com. Venez. 3: 152. 1928. *Cassia bacillaris* L. f. Suppl. 231. 1781. *Chamaefistula bacillaris* (L. f.) G. Don, Gen. Syst. 2: 451. 1832.

Shrub or small tree, the younger branchlets, petioles and short compact panicles more or less ashy-puberulent including the flowers; gland stout, conical, only between the lower and somewhat smaller of the 2 pairs of inequilateral leaflets, these typically dull and glabrous above, and glabrous or minutely puberulent beneath, acute or acuminate, commonly about 1 (to rarely 2) dm. long, 3–5 cm. wide; pedicels 2–3 cm. long; bracts promptly caducous; sepals 8–12 mm. long; petals light yellow, obovate, clawed, 2–3 cm. long; stamens subequal; ovary and style incurved, ashy-strigose to the clavate tip; pods terete, shortly pediceled, apiculate, 1–3 dm. long, nearly 1 cm. thick, dehiscing along the inner suture, the seeds surrounded by pulp.—The Peruvian form, possibly a distinct species,

may be known as var. **Benthamiana** Macbr., var. nov., ramulis subangulatis; foliolis supra nitidulis utrinque praecipue subtus plus minusve pilosis 3–7 (8) cm. longis, 2.5–4.5 cm. latis, obtusis vel breviter acutis. Type, *Williams 566*.

The following material was in part named *C. chrysocarpa* Desv. 523, which has a filiform glabrous style, the ovary pubescence yellow and much smaller leaflets (2–6 cm. × 1–2.5 cm.), the lower with a slender oblong gland. As noted by Bentham, l.c. 522, the affinity is rather with *C. fruticosa* or *C. oxyphylla* Kunth, 521, the latter a more northern species known from as near as Ecuador with the ample acuminate leaves of typical *C. fruticosa* often however pilose beneath (*C. Hartwegi* Benth.) but with sepals only 6–8 mm. long, petals only 10–16 mm. long. Accordingly Bentham's suggestion that the Peruvian plant "may be considered perhaps as a broad-leaved pubescent variety of *C. bacillaris*" (i.e. *C. fruticosa*) seems to be as good a disposition as any and the variety may appropriately bear the great monographer's name. *C. puberula* HBK. of Colombia with appressed puberulence has been reduced to *C. fruticosa;* it however apparently has persisting stipules and axillary racemes, characters that suggest *C. affinis* and *C. latifolia*. In this connection it may be remarked that *C. speciosa* Schrad., 524, with rather similar leaflets and pubescence has the 3 lower stamens with conspicuously elongate filaments and therefore is not the Peruvian plant nor indeed the Colombian one to which Britton and Killip referred material.—About 4 meters high. Illustrated, Mart. Fl. Bras. 15, pt. 2. *pl. 31;* Trans. Linn. Soc. 27: *pl. 62*.

Amazonas: Chachapoyas, *Mathews 1591* (det. Benth. as var.). Balsas, *Weberbauer 4277*.—Loreto: Near Iquitos, *Klug 1029; Williams 7905* (distr. as *C. viminea*); *Mexia 6501*. Pebas, *Williams 1762*. Balsapuerto, *Klug 2917*. Río Nanay, *Williams 566*. Río Mazán, *Williams 89; José Schunke 165*. To Yucatan and the West Indies. "Retamillo," "retama comun," "amargo-caspi," "lluichu-vainilla" (Mexia).

Cassia glandulosa L. Sp. Pl. 542. 1753; 576. *Chamaecrista glandulosa* (L.) Greene, Pittonia 4: 286. 1899.

Low shrub usually only a dm. or two high, with spreading, often arcuate branches, the flowering, conspicuously stipulate branchlets finely puberulent; leaflets usually 10–16 pairs, oblong, oblique at base, rounded and minutely mucronulate at apex, glabrous or beneath somewhat puberulent, closely parallel-veined, the midnerve little

excentric, 1–1.5 (2) cm. long, usually 3–4 mm. broad, gland distinctly stiped; peduncles short with usually 2–3 long-pediceled flowers; sepals lanceolate, acuminate, about 9 mm. long, puberulent, the largest petal to 1.5 cm. long; pods lightly pilose, 3–5 cm. long, about 5 mm. broad.—Var. *Swartzii* (Wickstr.) Macbr. is a form with 2 petiolar glands, fide Amshoff, On S. Am. Papil. 27. 1939. The Peruvian specimens seem to be indistinguishable from the typical form of the West Indies which according to Britton & Killip is restricted to Jamaica. Illustrated, Bot. Mag. 62. *pl. 3435;* Addisonia 13. *pl. 444* (var. *Swartzii*).

Huancavelica: Shrub-wood about 2,200 meters, Mantaro Valley and Mejorada, *Stork & Horton 10411; 10444; 10914* (det. Standl. *C. Chamaecrista*).—Cuzco: Acomayo, *Vargas 211* (det. Standl.). Valle del Apurímac, *Herrera 1184; 3054; 3056.* Valle del Urubamba, *Herrera 906b.* Probably widely distributed. "Huaranguillo," "mutui," "motuy," "kjeshua-surpuy."

Cassia grandis L. f. Suppl. 230. 1791; 515.

Allied to *C. fastuosa* but ashy or rusty-puberulent-tomentose, especially on the leaflets beneath, the anthers pilose, the three larger extended beyond the longer roseate petals, these to 14 mm. long; pods ligneous, fleshy, roughened by the cross veins, 4–6 dm. long, 3.5 cm. broad.—The pods, known as "Horse Cassia" and other names indicative of the fetid odor, are used as those of *C. fistula,* the pulp disagreeably scented. Widely cultivated. Illustrated, Trop. Agric. 25: 496. (fr.); Macmillan, Trop. Gard. & Pl. ed. 3, 85.

Peru: Ucayali, *Tessmann 3193.* Colombia to the West Indies.

Cassia Haughtii Macbr., spec. nov.

Fruticosa circa 1 m. alta; foliis breviter petiolatis eglandulosis, glabris circa 1.5 dm. longis, circa 9-jugis; foliolis petiolulatis, oblongis fere basi paullo oblique rotundatis apice obtusis obscure mucronulatis 3–4 cm. longis, 12–15 mm. latis, membranaceis; racemis brevibus (circa 7 cm. longis), pedicellis ad 3 cm. longis minute pilosis; bracteis caducis, sepalis ut videtur coloratis membranaceis oblongis obtusis ad 11 mm. longis; petalis nerviis prominulis exceptis glabris circa 18 mm. longis; staminibus perfectis 8 aequalibus; leguminibus tenue stipitatis, acute apiculatis, valde compressis, puberulo-pilosis. —The pods are probably half mature, about 1 dm. long, 12 mm. wide, apparently membranous, the medial row of seeds barely obvious; the species may be related to *C. picta* G. Don, 552, of

Ecuador and the Galapagos, the line of seeds elevated, the leaflets larger; it is much like *C. siamea* Lam., 549, cultivated in warm regions, its leaves and sepals fleshy-coriaceous. The type is scrappy and the leaflets are somewhat deformed by disease and perhaps reduced in size.

Piura: Saucecito, 40 miles north of Sullano, *Haught F10*, type. Cerro Viento Ridge, *Haught 62*.

Cassia helveola Macbr. Field Mus. Bot. 8: 91. 1930.

Shrub, sometimes 2 meters high, the branchlets, petioles and inflorescence more or less densely shortly and softly rusty-pubescent; leaflets mostly 8–12 pairs, oblong-elliptic, rounded at both ends, 1.5 cm. long, 8 mm. broad, glabrous or nearly above except the midnerve, subappressed pilose beneath; glands convex, between the two lower pairs of leaflets or often none; stipules minute, setaceous; racemes few-flowered; peduncles 3–6 cm. long, pedicels slender, about 1.5 cm. long; bractlets acuminate; sepals colored, pilose, 4 mm. long, the petals twice as long or longer; pods stiped, to 9 cm. long, 1 cm. broad, sparsely setose and minutely puberulent.—The specimens from Huancavelica, as is so often the case, diverge somewhat from those from central or southern Peru; in this instance they may become var. **huancavensis** Macbr., var. nov., sepalis leviter pilosis vel glabratis; antheris mediocriter inaequalibus.—Type, *Weberbauer 7608*. Section *Chamaesenna*.

Ancash: Huaraz, *2526*.—Huancavelica: Montaro Valley, *Weberbauer 7608* (var.). Globose clumps, gravelly hillsides, Pampas, *Stork & Horton 10230* (var.).—Huánuco: Yanahuanca, *1183*, type.

Cassia hirsuta L. Sp. Pl. 378. 1753; 534. *Ditremexa hirsuta* (L.) Britton & Rose in Britton & Wilson, Surv. Porto Rico 5: 372. 1924.

Conspicuously pilose-hirsute (even to the calyces) fetid herb, often woody toward the base, the erect stems sometimes a meter or more high; leaflets usually 5 pairs, ovate-oblong-lanceolate, slightly oblique at base, acuminate, membranous, 4–9 cm. long, about 3 cm. broad; gland near base of petiole cylindrical; racemes axillary or terminal, densely few-flowered; pedicels to 1 cm. long; sepals 6–10 mm. long, the orange petals 10–14 mm. long; perfect stamens 6; ovary villous; pods narrowly linear, arcuate, 1.5–2 dm. long, 4–6 mm. broad.—Section *Oncolobium*. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 34*.

Cajamarca: Cayacate, (*Raimondi*).—San Martín: Lamas, *Williams 6386*. San Roque, *Williams 7090*. Moyobamba, *Klug 3604*.—Lima: Obrajillo, *Wilkes Exped.*—Junín: Tarma, *Ruiz & Pavón*. La Merced, *5256*.—Cuzco: Valle de Santa Ana, 1,000 meters, (*Herrera 3491*). Valle de Lares, *Diehl 2403*. Echarate, Prov. Convención, *Goodspeed 10489*. Santa Ana, *Cook & Gilbert 1549*. Warm America. "Asnacjcora" (C. & G.).

Cassia Hoffmanseggii Mart. ex Benth. in Mart. Fl. Bras. 15, pt. 2: 104. 1870; 524.

Small tree or tall shrub, the terete often tortuous upper branchlets and leaflets beneath minutely puberulent (scarcely visible except with lens) or glabrous; leaflets 4, ovate, little oblique, shortly acuminate, rounded at base, lustrous above, reticulate-veiny both sides, the upper pair usually 7–12 cm. long, 4–6 cm. broad; gland ovate or conical, obtuse; stipules promptly caducous; flowers few, yellow, in a short terminal panicle; sepals nearly glabrous, the broadly ovate inner 12 mm. long; petals 2.5–3 cm. long, broadly ovate with slender claw; 3 stamens conspicuously larger and rostrate, the 4 intermediate ones 6–8 mm. long, truncate; ovary glabrous or obscurely puberulent; pods more than 2 dm. long, nearly 2 cm. broad, finally dehiscing, the coriaceous valves finely transverse-veined.—*Killip & Smith 27392*, Iquitos, in young fruit, noted by collectors as a "herbaceous vine," probably is a young plant or shade form of this species. F.M. Neg. 6328.

San Martín: Tarapoto, (*Mathews 1589*, det. Benth.). Amazonian Brazil to Guiana.

Cassia Hookeriana Gill. ex H. & A. in Hook. Bot. Misc. 3: 210. 1833; 539. *C. versicolor* Meyen ex Vog. Syn. Cass. 29. 1837.

Shrub, 1–3 meters high, glabrous or the densely leafy sulcately angled branchlets sparsely glandular and evanescently pubescent toward the tips; stipules narrow, acuminate, caducous or subpersisting; leaflets 8–9 pairs (or fewer), oblong, rounded at both ends but slightly oblique at base, usually 2–3 cm. long, about 8 mm. wide, pale green above, discolored beneath; well-developed clavate-filiform glands only between the first or sometimes also second leaflets; racemes about as long or shorter than the leaves with 2–3 or several flowers; pedicels about 1 cm. long; sepals 5 mm. long; petals about 8 mm. long; 3 stamens only slightly longer than the remaining fertile 4; ovary more or less pubescent, soon glabrous;

pods 7 cm. long, 15 mm. broad, membranous, attenuate at base into stipe scarcely 5 mm. long.—Type from Argentina but there seems to be no essential difference between material from there and Bolivian and southern Peruvian specimens. It is probable that the Raimondi collections (det. Dahlem) are referable rather to *C. latopetiolata*, which however may not be distinct.

According to Herrera the shrub furnishes an excellent fire-wood and the flowers are used by the native people in salads. Illustrated, Jorgensen, Anal. Mus. Nac. Hist. Nat. B. A. 28: 503 (veg.). F.M. Neg. 1766.

Amazonas: Prov. Luya, (*Raimondi*).—Libertad: Palmabal to Uningambal, (*Raimondi*).—Cuzco: San Sebastian, rocky canyon, 3,300 meters, *Pennell 13600*. Huatanay canyon, (Weberbauer 181, as *C. latopetiolata*). Colinas del Rodadero, *Vargas 3133*. Torontoy, 2,500 meters, (*Herrera 906A*). Sicuaní, 3,550 meters, *Hicken; Cook & Gilbert 91*. Saxaihuamán, 3,500 meters, (*Weberbauer*). Valle del Paucartambo, (*Herrera 236*, as *C. latopetiolata*).—Puno: Lake Titicaca, *Meyen* (type, *C. versicolor*). Near Puno, 4,000 meters, *Soukup 405*. Fimahuaca, (*Raimondi*, det. Dahlem, *C. latopetiolata*). Baja Isla, Lake Titicaca, 3,825 meters, *Mexia 04260* (det. Johnst. *C. latopetiolata*). To Argentina; Chile. "Mutui," "motuy," "saligua."

Cassia huancabambae Harms, Repert. Sp. Nov. 18: 94. 1922.

Sprawling shrub similar to *C. biflora;* leaflets 3–4 pairs, short-oblong or slightly obovate, 4–10 mm. long, 2–5 mm. broad, the slender stiped gland between the lowest pair often deciduous; peduncles 1–2 cm. long, the 1–2 (3) pedicels 7–10 mm. long; ovary finely sericeous; pods puberulent or glabrate, 7–8 cm. long, 5–6 mm. thick. —F.M. Neg. 1693.

Piura: In open formation, valley of the rivers, Huancabamba, 1,700 meters, *Weberbauer 6285*, type.

Cassia incarnata Pavón ex Benth. Trans. Linn. Soc. 27: 545. 1871.

Shrub, 1–3 meters high, the branchlet tips, petioles and short inflorescences lightly pilose-puberulent; stipules falcate, aristate, subpersisting; leaflets oblong, rounded at both ends (the base oblique), petiolulate, 12–20 mm. long, 5–8 mm. broad, in age glabrous or nearly beneath, obscurely veined; peduncles axillary, shorter than the leaves, bracteolate apically and there bearing, pseudo-

umbellately, 3–7 bright yellow flowers on pedicels about 2 cm. long; sepals thin, the inner orbicular ones 6–8 mm. long; largest petal nearly 2 cm. long; larger anthers narrowly rostrate; pods plane, margined, 7–10 cm. long, 5 mm. broad.—F.M. Neg. 28006.

Lima: Without locality, *Ruiz & Pavón.* Atocongo, open calcareous hills, *Pennell 14748.* Matucana, flowers a clear bright yellow, *384* (det. Rose). Bolivia; Ecuador.

Cassia laevigata Willd. Enum. Hort. Berol. 441. 1809; 527. *Chamaefistula laevigata* G. Don, Gen. Syst. 2: 452. 1832. *Adipera laevigata* (Willd.) Britton & Rose in Britton & Wilson, Surv. Porto Rico 5: 537. 1924.

Slender glabrous shrub, rarely semi-scandent, the branches or stems herbaceous above, often a meter or two high; leaflets 3–5 pairs, with slender or conical glands between at least the lower pairs, ovate-lanceolate, acutely acuminate, mostly 3–7 cm. long, about 2.5 cm. broad, membranous, light green; stipules subulate, caducous; racemes upper axillary, the flowers crowded; sepals colored, 6–10 mm. long, the bright yellow petals to 16 mm. long; pods subsessile, cylindrical, usually dehiscing along one margin, beaked by the persisting style, 6–9 cm. long, about 1 cm. thick.—Var. *scandens* Bentham is apparently the form of San Martín allied to *C. bicapsularis.* Illustrated, Rock, Leg. Pl. Hawaii, *pl. 34.* F.M. Negs. 1795; 32083 (var.).

Lima: Chosica, river bottom shrubs, *2860.*—San Martín: Near Moyobamba, *Klug 3674* (var.). Tarapoto, *Spruce 3925* (type, var. *scandens*).—Apurímac: Abancay, fence rows, *Goodspeed 10634; Vargas 745.*—Cuzco: Valle del Apurímac, (*Herrera 1178*).

Cassia latifolia G. F. W. Meyer, Prim. Fl. Esseq. 166. 1818; 522.

Shrub or tree-like, the upper branches more or less climbing when growing in forests, strongly angled, puberulent as the petioles and short inflorescences; gland between the first pair of leaflets broadly conical, obtuse, that between the upper much smaller or wanting; leaflets ovate-oblong, the larger terminal ones 12–16 cm. long, 5–9 cm. broad, rather obtusely acuminate, rounded or somewhat cordate at the more or less oblique base, subcoriaceous, lustrous and conspicuously reticulate-veined both sides, often discolored and obscurely puberulent at least on the nerves beneath; flowers intensely yellow to orange, the pedicels about 2 cm. long or longer; sepals colored,

1–1.5 cm. long; petals obovate, clawed, 2–3 cm. long; fertile stamens subequal, bluntly cusped; style incurved-clavate apically; pods semi-ligneous to 3 dm. long, 1 cm. thick, dehiscing along the upper suture at maturity.—The typical form readily recognized by broad, almost foliaceous stipules, but the forma *falcistipula* Ducke (var. *falcistipula* Ducke) has much narrower smaller stipules and in this character then simulates *C. quinquangulata.*

San Martín: San Roque, *Williams 7633.* Near Moyobamba, *Klug 3582.*—Ayacucho: Río Apurímac Valley, *Killip & Smith 22939.* —Loreto: Balsapuerto, *Klug 3000.*—Río Acre: (*Ducke 4252*). Amazonian Brazil.

Cassia latopetiolata Dombey ex Vog. Syn. Cass. 29. 1837; 539.

Like *C. Hookeriana,* and probably should be treated as a geographical variety, but the larger anthers extend to about their own length above the smaller, and the pods are more abruptly stiped, 7–11 cm. long, 12 mm. broad; stipules various, sometimes ovate, caducous or persisting; leaflets 8–12 pairs; petals to 12 mm. long. Variable in development of leaf-glands.—F.M. Neg. 1698.

Cajamarca: Celendín, 2,625 meters, *Woytkowski 6.*—Lima: Río Blanco, large clumps, steep hillside, *772.* Chicla, (*Raimondi*).—Junín: Tarma, *1074; Killip & Smith 21886; Ruiz & Pavón; Dombey.* Vicinity La Oroya, *Kalenborn 146.*—Huánuco: Llata, compact 1-meter shrub, *2247.* Chavanillo, tree to 4 meters, *1978.* Huanta, (*Raimondi*). Bolivia; Ecuador. "Tumbo," "sayigua."

Cassia leiandra Benth. in Mart. Fl. Bras. 15, pt. 2: 94. *pl. 30.* 1870; 516.

Allied to *C. grandis* and similar but the fragrant flowers bright yellow, the petals typically 16–18 mm. long, the anthers glabrous, the ovary shortly villous, and the pods less compressed, torulose between the smooth sutures, about 2 cm. thick.—The Peruvian material, at least mostly, is var. **peruviana** Macbr., var. nov., a planta typica foliolis 2.5–3.5 cm. longis, circa 1 cm. latis, floribus minoribus, petalis vix 1 cm. longis differt.—*José Schunke 336,* type. *C. moschata* HBK. is similar but the ovary is glabrous; *C. rubriflora* Ducke, Archiv. Jard. Bot. Rio Jan. 3: 110. 1922, Brazil, has unequal petals, blood-red except the larger, and opaque leaflets that are sparsely puberulent above as well as beneath.

Loreto: Upper Marañón, *Tessmann 4240* (det. Harms affine). Middle Ucayali, *Tessmann 5455* (det. Harms). Florida, *Klug 2321*

(var.). Río Mazán, *José Schunke 336* (var.). Brazil. "Jacaranda," "marimarí."

Cassia leiophylla Vog. Syn. Cass. 25. 1837; 542. *Vogelocassia leiophylla* (Vog.) Britton, N. Amer. Fl. 23: 259. 1930.

Slender shrub, glabrous, puberulent or softly pubescent, the leaves with 2–3 pairs of broadly obovate apically rounded but minutely mucronulate leaflets, the gland between the first pair narrowly oblong; stipules linear-setaceous, often about 1 cm. long, more or less persisting or small and caducous; larger leaflets usually about 5 cm. long, 3 cm. broad; peduncles in the upper axils, 1 cm. long, 1–2-flowered, the pedicels finally 2.5 cm. long or longer; sepals membranous, the larger 10–12 mm. long, the larger petal 2–2.5 cm. long; pods subsessile, arcuate, to 12 cm. long, 4 mm. broad, sparsely puberulent or glabrate, the margins nerviform.—Var. *pubescens* Benth. apparently differs only in being softly pubescent. Section *Chamaesenna*. F.M. Neg. 1701.

San Martín: Near Tarapoto, *Spruce 4299*. San Roque, *Williams 7257*.—Junín: La Merced, *Killip & Smith 23805*. Colonia Perené, *Killip & Smith 24967*. Brazil; Central America; Mexico. "Retanilla."

Cassia leptocarpa Benth. Linnaea 22: 528. 1849; 531. *Ditremexa leptocarpa* (Benth.) Britton & Rose, N. Amer. Fl. 23: 256. 1930.

Slender fetid shrub, herbaceous above, glabrous or more or less hirsute especially on the leaflets beneath and then particularly resembling *C. hirsuta* but the pods rarely more than 3 mm. broad, to 2.5 dm. long, and the seeds oblique.—The pubescent form is var. *hirsuta* Benth.

Peru: (fide Bentham). Brazil to New Mexico.

Cassia loretensis Killip & Macbr., spec. nov.

Frutex vel arbor; ramulis teretibus, striatis junioribus breviter pilosis; foliolis bijugis (glandula conica inter inferioribus) oblique oblongo-ellipticis breviter acuminatis plerumque 1–2 dm. longis, 6–12 cm. latis interdum minoribus, subtus plus minusve pilosis, supra glabris, nitidis, utrinque reticulato-venosis; racemis axillaribus subcorymbosis vel ad apices ramorum subpaniculatis, 5–14 cm. longis, flavescente puberulo-pilosis; pedicellis 2–3 cm. longis; sepalis oblongo-obovatis, membranaceis, paullo nervatis 10–12 mm. longis; petalis late obovatis ad 2 cm. longis, 12–15 mm. latis, in unguem

brevem contractis; antheris subaequalibus 6–7 mm. longis; leguminibus torulosis.—Nearly *C. affinis* Benth., 520, but leaflets more definitely acuminate, pubescence denser and softer, petals, when fully grown, larger. The leaflets are often shorter than 1 dm., especially on the specimens from Tarapoto, and the lower pair is usually half as large as the upper. We had indicated the plant as a variety of Bentham's but that seems to have somewhat angled branchlets and the young pods of *C. loretensis* suggest that they may furnish a further distinction between the species. The specimens were distributed as *C. chrysocarpa* Desv., *C. viminea* L., *C. macrophylla* Kunth, all different. The relationship is probably with *C. obliqua* and *C. Ruiziana* with similar pods and we are not certain that the Tarapoto specimens belong to our species. It sometimes attains 10 meters.

San Martín: Tarapoto, *Williams 5459; 5541; 5828; 6125; 6237.* —Loreto: Río Mazán, *José Schunke 206*, type. Fortaleza, near Yurimaguas, *Klug 2776.* "Retama," "flor de caña."

Cassia lucens Vog. Syn. Cass. 46. 1837; 549. *C. racemosa* Mill. Gard. Dict. ed. 8: no. 19. 1768, as to Peru.

Tree, sometimes 10 meters high, the leaves with 8–10 pairs of petiolulate oblong-lanceolate acuminate leaflets, typically obliquely rounded at base, ordinarily 5–10 cm. long, 1.5–3 cm. broad, glabrous and lustrous above, glabrate or pilose-puberulent beneath, the glands obsolete or lacking; racemes paniculate, the inflorescence usually ample and much exceeding the leaves, rusty-puberulent or the calyces glabrous; sepals 7–10 mm. long, the larger inner ones membranous; petals 1–2 cm. long, clawed, obviously unequal; 3 larger stamens about half again as long as the 4 cusped smaller ones and somewhat rostrate; pods oblong, straight, compressed, lustrous, membranous, 1.5 dm. long or longer, about 2 cm. broad.—The application of Miller's name, based on a plant from Cartagena, Colombia, with only 5 pairs of leaflets, appears not to have been determined. *C. racemosa* var. *tenuifolia* Huber, Bol. Mus. Goeldi 4: 564. 1906, now of necessity *C. lucens* var. **tenuifolia** (Huber) Macbr., comb. nov., has, according to Huber, thin membranous larger leaflets acute at base, distinctly and obtusely acuminate and mucronate, the flowers smaller. *C. siamea* Lam. of tropical Asia and commonly cultivated in warm regions is similar but has coriaceous sepals and pods. Determinations, except as noted, by Standley. Section *Chamaesenna.*

San Martín: Pongo de Cainarachi, *Klug 2624*. Chazuta, *Klug 4039*.—Loreto: Balsapuerto, *Klug 2862*. Caballo-cocha, *Williams 2070; 2199*. La Victoria, *Williams 2608; 2897* (det. Harms). Yurimaguas, *Klug 2799; Killip & Smith 27934; Williams 3863; 7849; Mexia 6074*. Canchahuaya (*Huber*, var.). Tropical South America.

Cassia macrophylla Kunth, Mimoseae 126. *pl. 38*. 1819; 519. *Chamaefistula macrophylla* G. Don, Gen. Syst. 2: 451. 1842. *Chamaefistula gigantifolia* Britton & Killip, Ann. N. Y. Acad. Sci. 35: 171. 1936 as to Peru.

Shrub or small slender tree with terete branchlets and ample leaves, the 2 pairs of broadly ovate acuminate leaflets with a stout gland between the lower; petioles, peduncles and short axillary or supra-axillary racemes minutely puberulent or glabrate as the leaflets beneath, these membranous, slightly lustrous above, reticulate-veined, obliquely rounded at base, ordinarily 2–3 dm. long, 1–1.5 dm. broad; peduncle 1–3 cm. long, the pedicels 1–3 cm. long or longer, crowded together; sepals 6–8 mm. long, obtuse, drying blackish and conspicuously elevate-veined, usually also somewhat reticulate; petals clawed, 16–20 mm. long, venose; anthers 7, subequal, the 3 slightly larger cusped; ovary minutely puberulent, the style apically clavate.—Non-inundated secondary forest, to 4 meters high, the flowers pale yellow; stipules setaceous but often on same branch, foliaceous; pods 2.5 dm. long, slender, torulose (Ducke). Flowers often borne on the older stems. F.M. Negs. 1706; 32087.

San Martín: Tocache, *Poeppig 1950*.—Loreto: Lower Río Nanay, *Williams 365; 384; 532* (det. Standl., *C. viminea*). Río Itaya, *Williams 50*. Near Iquitos, *Klug 279* (distr. as *Ch. gigantifolia*); *Klug 1014; Killip & Smith 27126; Ducke 16986*. Río Mazán, *José Schunke 207* (det. Standl., *C. bacillaris*). Brazil; Colombia; Venezuela. "Yana-huira."

Cassia multijuga Rich. Act. Soc. Hist. Nat. Paris 1: 108. 1792; 546.

Small or medium-sized tree (rarely 20 meters tall), the leaves with many (18–40) pairs of oblong obtuse leaflets, the stipules usually setaceous and deciduous or those in the often showy inflorescences more persisting and bract-like, the racemes usually in ample terminal panicles; leaflets apparently very variable in size, 1.5 cm. long, 4 mm. broad, or usually about 3 cm. long or longer, and 1 cm. broad, glabrous or glabrate above, paler and glabrous to densely

puberulent-pilose beneath, usually with a rather slender gland between the first pair; pedicels 1–2 cm. long; larger inner sepals 4–6 mm. long; petals often very unequal, to 2 cm. long, puberulent without on the nerves or glabrous; 3 anthers slenderly beaked, 7–9 mm. long, the 4 much shorter intermediate ones cusped, bipored, subsessile; pods plane, margined, 1–2 dm. long, 12–18 mm. broad. —Flowers deep yellow, odorless (Woytkowski). Var. *Lindleyana* (Gardner) Benth. is the form with soft rusty pubescence. Section *Chamaesenna*. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 37*.

San Martín: Tarapoto, *Spruce 4147* (var. det. M. Arg.). Lamas, *Williams 6458* (var.).—Huánuco: Shapajillo, 630 meters, *Woytkowski 6*.—Junín: Puerto Yessup, *Killip & Smith 2641* (det. Harms). Pichis Trail, *Killip & Smith 26208*.—Loreto: Río Mazán, *José Schunke 2* (det. Harms). Mishuyacu, *Klug 1396* (det. Harms). Pebas, *Williams 1754*. Brazil to the Guianas. "Pashaca," "sinespina," "quillo-sisa."

Cassia obliqua R. & P. ex G. Don, Gen. Syst. 2: 451. 1832; 519. *Chamaefistula obliqua* R. & P. l.c. *Chamaefistula elegans* R. & P. l.c. *Cassia peruviana* Vog. Syn. Cass. 40. 1837.

Shrubby, the upper branches subherbaceous or more or less climbing, glabrous or minutely puberulent on the younger parts; leaflets 2 pairs, ovate-elliptic, shortly acuminate, strongly oblique at base, the terminal 10–12 cm. long, 5–5.5 cm. broad, the lower pair about half as large and with a narrow gland between them, lustrous, membranous or subcoriaceous in age, reticulate-veined both sides; stipules minute, setaceous; peduncles axillary, several to 10 cm. long, the few pedicels approximate, 2–3 cm. long; sepals narrowly ovate, 6–8 mm. long; petals clawed, subequal, to 18 mm. long; stamens of *C. macrophylla*, the 3 lower somewhat larger on longer filaments; pods subterete, rounded at both ends, aristate at tip by the persisting style, 5 cm. long or longer, about 1 cm. thick, torulose. —*C. scandens* R. & P., type from Guayaquil, is probably not distinguishable. F.M. Neg. 1715.

Huánuco: Muña, *Ruiz & Pavón*, type. Near Muña, *4186*.

Cassia occidentalis L. Sp. Pl. 539. 1753; 532. *Ditremexa occidentalis* (L.) Britton & Rose in Britton & Wilson, Surv. Porto Rico 5: 372. 1924.

With many of the characters of *C. hirsuta* but the broadly ovate stipules caducous, the gland tuberculiform; pods glabrous, 5–7 mm.

broad.—Resembles also *C. laevigata*, except that the gland is not between the first pair of leaflets. Weedy type of plant with a rather disagreeable odor, widely distributed. The seeds, roasted, have been used as a substitute for coffee (Ducke). Williams specimens determined by Standley. Section *Oncolobium*. Illustrated, Degener, Fl. Hawaii.

San Martín: Tarapoto, (*Raimondi*); *Williams 5398*.—Lima: (*Raimondi*).—Loreto: Río Nanay, *Williams 401; 1251* and others. San Salvador, *Williams 1566*. Yurimaguas, *Williams 4026*. Near Iquitos, *Klug 283; 1425; Williams 1437*. La Victoria, *Williams 4025*. Caballo-Cocha, *Williams 2125*. Río Itaya, *Williams 3270*. Barrancos of the Ucayali, (*Huber*). Tropical regions. "Aya-poroto," "ayak-poroto," "aya-parotillo," "retama," "retamilla," "achpu-poroto."

Cassia pallidifolia Macbr., spec. nov.

Frutex vel arbor; ramis teretibus; foliolis ut videtur bijugis (glandula crassa inter inferioribus), glabris, oblique oblongis, longe et acute acuminatis, 2 dm. longis, 8 cm. latis, subchartaceis, paullo nitidulis subtus distincte pallidioribus, venis primariis elevatis venulis reticulatisque; racemis axillaribus (ut videtur caulifloris) brevibus; pedunculis et pedicellis 2–2.5 cm. longis, sparse puberulis; sepalis oblongis coriaceis, margine scariosis laevibus, glabris 6 mm. longis; petalis oblongo-obovatis 10–12 mm. longis, venis exceptis glabris; antheris 5 mm. longis, glabris vix inaequalibus. —Notwithstanding the incomplete and broken character of the material it seems desirable to give this plant a name here; its relationship is evidently with *C. Ruiziana* as was suggested by Harms but as indicated its leaves and sepals are at variance in character. The solitary leaf, however, must be abnormal; the petiole was apparently injured and in healing produced a secondary stalk with a pair of long-petioled leaflets forming thus a bipinnate leaf; in the first abnormal axis and between the first leaflets on the secondary stalk there is a stipule. There appears to be the gland, as usual in this group, between the first pair of leaflets, on the normal portion of the leaf.

Junín: Chanchamayo Valley, *Carlos Schunke 62*, type.

Cassia patellaria DC. in Collad. Hist. Cass. 125. *pl. 16*. 1816; 578. *Chamaecrista patellaria* DC. l.c.

Short-lived perennial more or less lignescent below, well marked among species of section *Chamaecrista* by the dense pubescence of

somewhat curved trichomes that extends even to the calyces and the small flowers, these only 5–6 mm. long, the petals and acuminate sepals subequal; leaflets 10–25 pairs, oblong, linear, mucronate, 10–15 mm. long, 2–3 mm. broad, with 3–4 lateral nerves, the midnerve very excentric; gland 1 or sometimes 2, sessile, depressed; peduncles short, the flowers few; bracts striate, 4–6 mm. long, the bractlets about half as long; pods slightly curved, narrowly oblong, 2.5 cm. long, 3 mm. broad.—Cf. notes under *C. Chamaecrista, C. Pennelliana.* Determinations by Harms. Illustrated, Med. Algem. Proefst. Landb. no. 16. *pl. 2.*

San Martín: Tarapoto, *Williams 6522.*—Junín: Chanchamayo Valley, *Schunke 1404; 1405; 1418.*—Amazonas: Chachapoyas, (*Raimondi*). South America and the West Indies.

Cassia Pavoniana G. Don, Gen. Syst. 2: 447. 1832; 577.

Resembles *C. glandulosa* but the gland shortly and stoutly stiped; strict shrub with virgate erect pubescent somewhat flexuous branches, the leaves with 10–20 pairs of oblong cuspidate nerved leaflets, glabrous or nearly both sides, coriaceous, the midnerve excentric, about 10 mm. long, 2.5 mm. broad; flowers solitary or geminate, showy, like those of *C. glandulosa.*—Bentham included this plant in *C. glandulosa* and it could readily be treated as a variety, but it seems from habit and character of gland to be as well marked as the other forms segregated. Harms referred the following collections to *C. Chamaecrista* sens. lat. *C. flexuosa* L. with flexuous stems has broad stipules, narrower usually more numerous leaflets, sessile gland.

Cajamarca: Near Socota, 2,800 meters, *Stork & Horton 10103* (det. doubtful).—Lima: Chosica, *2853.* Near Callao and Lima, *Wilkes Exped.*—Huánuco: Near Huánuco, *3541; Ruiz & Pavón,* type. Mito, *3260.*—Junín: Huacapistana, *Killip & Smith 24239*(?).

Cassia Pearcii Benth. Trans. Linn. Soc. 27: 552. 1871.

Similar to *C. cuspidata* but completely glabrous, the leaflets rather thin but rigid and tipped with a seta 3 mm. long; sepals petaloid, petals yellow, beautifully marked by the contrasting veins and veinlets; larger anthers 14–16 mm. long, aristately sagittate at base, the 4 intermediate 6 mm. long, the 3 staminodia deltoid; pods (immature) shortly stiped, to 9 cm. long, 15 mm. broad, membranous, lustrous, marked by the septae of the transverse seeds and seemingly wing-margined by the attenuate tissue.—The pods

resemble those of *C. picta* G. Don, the seeds in a continuous elevated line down the middle but its leaves are obtuse or emarginate and soft in texture.

Huancavelica: Vicinity of Surcubamba, 1,800–2,700 meters, *Stork & Horton 10398* (det. Standl.). Bolivia.

Cassia Pennelliana Amsh. Med. Bot. Rijks Herb. Utrecht 52: 28. 1939. *Chamaecrista Browniana* Britton & Rose, N. Amer. Fl. 23: 293. 1930, not Kunth, 1824.

Allied to *C. Pavoniana* but the densely appressed pubescent stem simple; leaflets 20–40 pairs, the gland oblong, 2–2.5 mm. long, sessile, the pods glabrous or closely short-pilose.—Very near to *C. Leschenaultiana* DC., apparently introduced into Colombia, with a subsessile stout-cupulate gland. *C. flexuosa* L. has 15–50 pairs of narrow leaflets, the stems flexuous; *C. mimosoides* L. is, as indicated by Britton & Killip, Asiatic, and has almost minute leaflets.

Peru (probably). Central America; Colombia; Bolivia.

Cassia picta G. Don, Gen. Syst. 2: 444. 1832; 552.

Resembles *C. cuspidata;* leaflets to 7 pairs, broadly oblong-elliptic, rounded at both ends, weakly and minutely cuspidate, about 6 cm. long, 2.5 cm. wide, membranous, completely glabrous as the racemes.—This may well prove to be the earliest name for a variable species including besides *C. cuspidata, C. Pearcii,* but, slight as the distinguishing characters are, no intermediate specimens have been seen. F.M. Neg. 1728.

Piura: Pariñas Valley, *Haught 270.* Common on alluvial plain, Serrán, *Stork 11382.* Galapagos; Ecuador.

Cassia pilifera Vog. Syn. Cass. 23. 1837; 536. *Emelista pilifera* (Vog.) Pitt. Journ. Wash. Acad. Sci. 19: 176. 1929.

Half-shrub often a meter or two high, the somewhat angled stems or branches characteristically white-pilose, scarcely densely, the trichomes long and widely divaricate, rarely subappressed or nearly wanting; stipules linear-subulate, 1 cm. long, usually persisting; peduncles axillary, 1- or 2-flowered, often crowded in a short panicle and somewhat exceeding the leaves, these with 2 pairs of obliquely obovate or oblong-elliptic leaflets, rounded and barely mucronulate at tip, 2–5 cm. long, 1–3 cm. broad, conspicuously reticulate-veined and often pilose beneath, the glands slender; sepals very unequal, striate, 6–10 mm. long; petals clawed, to 2 cm. long; perfect stamens 6, the 2 larger shortly rostrate, 12–16 mm.

long, incurved on filaments 4 mm. long, the others subsessile; pods subquadrate, arcuate, tomentulose, 10 cm. long or longer, scarcely 4 mm. wide, aristate by the persisting style.—Section *Prososperma*. F.M. Neg. 1730.

Peru: Tarapoto, *Ule 6729*. Uruguay to Bolivia and Central America.

Cassia quinquangulata Rich. Act. Soc. Hist. Nat. Paris 1: 108. 1792; 523. *Chamaefistula Klugii* Britton & Killip, Trans. N. Y. Acad. Sci. 36: 173. 1936. *Chamaefistula quinquangulata* (Rich.) Pitt. Trab. Mus. Com. Venez. 3: 153. 1928.

Allied to *C. macrophylla* but the branches usually rather distinctly angled and the gland between both pairs of leaflets long and slender; leaflets ordinarily much smaller, the upper pair rarely 10 cm. long or slightly longer and half as broad, the lower often half as large, oblique at base, acuminate, lustrous above, subcoriaceous or firm-membranous, reticulate-veined, usually minutely puberulent beneath; racemes ordinarily axillary and only 4–5 cm. long, the pedicels about 2 cm. long; sepals ovate-oblong, obtuse or acutish, ashy-puberulent, obscurely nerved, 6 mm. long; petals 10–16 mm. long, lightly puberulent; pods 2–3 dm. long, about 15 mm. thick, acute both ends, rather coarsely reticulate-transverse-veined.—*C. viminea* L. to which the following material has mostly been referred is scarcely distinguishable unless by its terete branchlets and with a gland usually only between the first leaflets, and perhaps by a difference in pods. More or less scandent shrub.

Loreto: Yurimaguas, *Williams 3798; 4020; 4171*. Caballo-Cocha, *Williams 2112; 2122; 2143*. Río Nanay, *Williams 687; 1290*. Iquitos, *Williams 1537; Klug 202; Killip & Smith 26965; 27098*. Brazil to the Guianas and Colombia.

Cassia repens Vog. Syn. Cass. 60. 1837; 575.

Low, suffrutescent, typically sparsely pilose except the leaflets above, the branches procumbent-ascending from a woody caudex; leaflets 5–10 pairs, mucronate, pinnately veined, the midnerve little excentric, subcoriaceous, 10–12 mm. long, 3–4 mm. broad, rather rigid, the gland stipitate; flowers few, showy, like *C. glandulosa;* pods 2.5–5 cm. long, about 4 mm. broad.—F.M. Neg. 1739.

Loreto: Río Huallaga, (*Ule 6723*, det. Herb. Dahlem). Brazil.

Cassia reticulata Willd. Enum. Hort. Berol. 443. 1809; 550. *C. marginata* Willd. as to Williams, Field Mus. Bot. 15: 195. 1936.

Chamaesenna reticulata (Willd.) Pitt. Trab. Mus. Com. Venez. 3: 160. 1928.

Tall shrub or sometimes a tree to 15 meters, the younger parts including the leaves beneath and the racemes more or less puberulent or pilose; stipules coriaceous, subpersisting; leaflets 9–12 (14) pairs, broadly oblong or slightly obovate and oblique, rounded or obtuse both ends, ordinarily 7–10 cm. long, 2–4 cm. wide; bracts early imbricate becoming ovate, 1.5–2 cm. long, at anthesis caducous; sepals broad, colored, the larger about 12 mm. long, slightly exceeded by the deeply veined petals; perfect stamens 6, the 2 larger rostrate, 10 mm. long; pods oblong, compressed, lustrous, a dm. long or longer, 12 mm. broad or broader.—Klug noted that the root is boiled and used as a remedy for fever; the black pods as those of other species are employed as a purgative. F.M. Neg. 1740.

Junín: Puerto Yessup, *Killip & Smith 26299*.—Amazonas: Nauta, *Raimondi*.—Loreto: Near Iquitos, *Williams 1475; 7899; Klug 1107*. Río Itaya, *Williams 116*, and others. Río Nanay, *Williams 288; 367* (distr. as *C. marginata* Willd.). Caballo-Cocha, *Williams 2145*. Yurimaguas, *Williams 3822*. Pebas, *Williams 1735*. Río Mazán, *José Schunke 208*. Río Chupurana and open places along the Ucayali, (*Huber*).—Río Acre: Mouth of Río Macauhán, *Krukoff 5754*. To Central America and the Guianas. "Retama," "sapechihua," "shunashut."

Cassia Ruiziana Vog. Syn. Cass. 40. 1837; 520. *Chamaefistula Ruiziana* G. Don, Gen. Syst. 2: 451. 1832.

Closely allied to *C. macrophylla* and *C. obliqua* with the thick anthers of the former but the pods and colored obscurely nerved sepals of the latter, these however broadly ovate or suborbicular, puberulent, firm; leaflets ample, the terminal often 1.5 dm. long or longer, 7–9 cm. broad, lustrous and glabrous above, slightly puberulent beneath, acuminate, strongly oblique at base with stout conical gland between the lower; racemes shortly panicled, lateral (often cauliflower) with the long (5–10 cm.) peduncles ashy or rusty appressed strigillose; peduncles 1–2 cm. long; sepals obtuse, 3–4 mm. long, puberulent as the oblongish petals, these about twice as long, shortly clawed; pods subquadrate, strongly arcuate, shortly stiped, obtuse at both ends, torulose, 3–5 cm. long, crowned by the persisting style.—F.M. Negs. 29410; 32086.

Cajamarca: Tambillo, (*Raimondi*).—San Martín: Tarapoto, *Mathews 1921; Williams 6312*. San Roque, *Williams 7067*. Toward Moyobamba, (*Raimondi*).—Huánuco: Cuchero, *Poeppig 1391*. Pampayacu, *Kanehira 8*.—Junín: La Merced, *Killip & Smith 23531*.—Huancavelica: Río Mantaro, *Weberbauer 6574*.—Loreto: Iquitos, *Williams 7907*. Río Nanay, *Williams 392*. Pongo de Manseriche, *Mexia 6214* (det. Standl., *C. macrophylla*). Ecuador.

Cassia scarlatina Ducke, Bull. Mus. Paris sér. 2. 4: 730. 1932.

Like *C. swartzioides* and *C. Spruceana* especially the former; leaflets about 4 pairs, the larger (in the type) 10–12 cm. long, 4–5 cm. broad, moderately acuminate beneath, sparsely minutely puberulent, paler and subopaque; bracts caducous before anthesis; pedicels 1.5 cm. long; calyx segments unequal, even 13 mm. long, 9 mm. broad; petals scarlet, shortly clawed, the largest 16–18 mm. long, about half as broad, with 1 much smaller, about 12 mm. long, its long claw broadly auricled by a foliaceous fimbriate appendage.—The Peruvian specimens do not entirely accord; the leaflets of *Klug 3173* are 7 cm. long, scarcely 3 cm. broad, sepals about 7 mm. long, petals "brick-red," while *Schunke 30* has merely acute leaflets, "flowers white and clear red"; in both specimens the claw and the appendages are not so largely developed.

Loreto: Río Mazán, *José Schunke 30*. Pumayacu, *Klug 3173*. Amazonian Brazil. "Machetebaina."

Cassia spectabilis DC. Cat. Hort. Monsp. 90. 1813; 529. *Pseudocassia spectabilis* (DC.) Britton & Rose, N. Amer. Fl. 23: 230. 1930.

Tree with a short rusty-yellowish pilose puberulence on the branchlets and leaflets beneath and corymbose axillary or terminal inflorescences; leaflets (4) 8–15 pairs, oblong-elliptic, acutish to acuminate, 3–7.5 cm. long, about 1.5 cm. broad, glabrous or nearly above, paler beneath, glands lacking; sepals 5–7 mm. long; petals 1.5–2.5 cm. long, the larger upper spreading, the two lower incurved; perfect anthers 7, subequal, obtuse; pods subcylindrical, tardily if at all dehiscing along one side, obscurely torulose, often 3 dm. long or longer, 1.5 cm. thick.—*C. excelsa* Schrad. is very similar but the leaflets are mostly obtuse, the pods torulose. The determination of my Peruvian specimen may be open to question since the pods are distinctly quadrate. Section *Chamaefistula*.

Junín: Shrub sprawling in sandy valley brush, *5437* (det. Rose). —Cuzco: Santa Ana, *Cook & Gilbert 1504*. Bolivia; Ecuador to Central America and Trinidad.

Cassia spinescens Hoffm. ex Vog. Syn. Cass. 27. 1837; 545. *C. secedens* Ducke, Archiv. Jard. Bot. Rio Jan. 3: 113. 1922, fide Ducke.

Shrub well marked by the spinescent geminate stipules, these stoutly conical, recurved, 5 mm. long; branchlets somewhat angled, glabrous or obscurely puberulent toward the tips; leaflets (3) 5–6 pairs, ovate or oblong-elliptic, subcordate at base, acute, about 8 cm. long, 3–3.5 cm. broad, the lower pairs gradually smaller, with a subcylindrical gland between all of them, glabrous above, membranous, reticulate-veined, paler and slightly puberulent or glabrate beneath; racemes axillary or terminal and panicled, the showy crowded flowers on rusty-puberulent pedicels to 4 cm. long; sepals subobtuse, lightly puberulent, the larger about 8 mm. long; petals unequal, obscurely puberulent on the nerves, the larger to 3 cm. long, fertile anthers 7, the larger rostrate; pods compressed, glabrous, smooth, lustrous, the margins not enlarged, attenuate at base, 4–5 dm. long, 1–1.5 cm. broad, with impressed cross-lines.—The anthers in the Peruvian material are subequal, the larger one scarcely long-rostrate as in the type and the branchlets scarcely angled. Section *Chamaesenna*. F.M. Negs. 1748; 28017 (*C. secedens*).

Loreto: Río Mazán, 6-meter shrub, *José Schunke 180*. Río Itaya, *Killip & Smith 29824*. Amazonian Brazil. "Retama con espina."

Cassia Spruceana Benth. in Mart. Fl. Bras. 15, pt. 2: 92. 1870; 514.

Tree with spreading crown, the branchlets and young leaves minutely silky-puberulent, the latter glabrate in age; leaflets 3–5 pairs, obtuse to shortly acuminate, ovate-elliptic, typically acute at base, 7–12 cm. long, about 5 cm. broad, lustrous above, paler and opaque beneath, reticulate-veined both sides; petioles broadly grooved above, glands none; racemes axillary or lateral on the older branches below the leaves, laxly flowered, the bracts obtuse, caducous before anthesis, about 5 mm. long, the pedicels 2.5 cm. long or longer; sepals ovate, very obtuse, 10–12 mm. long; petals yellow with red veins, obovate, subequal, about 2.5 cm. long; stamens nearly those of *C. fistula* but the longer with slightly pubescent anthers; pods 3–6

dm. long, nearly 2.5 cm. thick, subterete, glabrous, the sutures rather prominent.—According to Ducke sometimes 30 meters high, beautiful when covered with fragrant yellow flowers. *C. Sagotiana* Benth. l.c. 93, of French Guiana, according to Ducke not specifically distinguishable, has leaflets all obtuse, the sepals 6 mm. long, petals to 18 mm. long, the intermediate anthers with longer basal lobes. *C. Rhonhofiana* Harms, Notizbl. Bot. Gart. Berlin 15: 46. 1940, of Ecuador has bright rose-colored petals, later pale yellow and acute bracts. Illustrated, Trans. Linn. Soc. 27: *pl. 60* (as *C. Sprucei*). F.M. Neg. 28020.

Peru (possibly). Amazonian Brazil to Guiana.

Cassia swartzioides Ducke, Archiv. Jard. Bot. Rio Jan. 5: 129. 1930.

Allied and apparently similar to *C. Spruceana* but, as to type, leaflets 5–7 pairs, the larger commonly 6–8 cm. long, 3–3.5 cm. broad, ovate or oblong-ovate, glabrous, obtuse or rounded at base, gradually acuminate; racemes binate on the older branchlets below the leaves attaining 1.5–2 dm., the flowering portion dense, ashy-puberulent, the small bracts persisting even to anthesis, the pedicels then to 2 cm. long or longer; calyx segments to 1.5 cm. long, about 7 mm. broad; petals subequal, barely clawed, white marked with rose below, 1.5–2 cm. long, about 8 mm. broad.

Loreto: Iquitos, (*Ducke*, type).

Cassia tenella HBK. Nov. Gen. & Sp. 6: 365. 1824; 571. *C. foliosa* G. Don, Gen. Syst. 2: 446. 1832?

Stems from a short ligneous rhizome, glabrous, as the rather obscurely pinnately nerved leaflets, these 3–4 pairs, obovate-cuneate, about 10 mm. long; gland shortly stipitate; flowers of medium size on pedicels 16 mm. long.—Stipules very small. As Bentham indicated, the species of G. Don judging from the meager description may belong here.

Peru(?): Without locality, (*Pavón*, type, *C. foliosa*). Venezuela.

Cassia tomentosa L. f. Suppl. 231. 1781; 528. *Adipera tomentosa* (L. f.) Britton & Rose, N. Amer. Fl. 23: 241. 1930.

Simulating *C. aurantia* when in flower but the branchlets and leaflets beneath conspicuously and softly yellowish-tomentose, the latter puberulent above, and especially the pods subcompressed,

softly tomentose, usually 10 cm. long, 1 cm. broad; leaflets 6–8 pairs, oblong, acutish, 4 cm. long, 15 mm. broad, usually considerably smaller, the glabrous dark-colored gland between each pair contrasting with the dense tomentose pubescence of the leaf-rachis; racemes often shorter than the leaves.—Cultivated for ornament and for the leaves, which are employed medically (Herrera). The flower buds are used as an ingredient in stews. Illustrated, Ann. Jard. Bot. Buitenzorg 21: *pl. 22*.

Cajamarca: Cutervo, (*Raimondi*).—Ancash: Pomabamba, (*Raimondi*).—Lima: (Weberbauer, 166).—Huánuco: Below Chavanillo, shrub 3 meters, *1986*. Chinchapalca, *1598*.—Amazonas: Chachapoyas, (*Raimondi*).—Arequipa: Near Atiquipa, (*Raimondi*).—Cuzco: Huasao, 3,200 meters, (*Herrera 909*).—Puno: Sandía, (Weberbauer, 237). Argentina to Mexico. "Alcaparra," "motoya," "huashlla," "mutui," "motuy."

Cassia Tora L. Sp. Pl. 376. 1753; 535. *Emelista Tora* (L.) Britton & Rose, in Britton & Wilson, Surv. Porto Rico 5: 371. 1924.

Slender, semi-woody, often 1 meter high, glabrate or slightly puberulent; stipules subulate, about 1 cm. long; leaflets (2) 3 pairs, oblong-obovate, broadly rounded at tip, glaucous, glabrous above, somewhat puberulent beneath, usually 3–4 cm. long, about 2 cm. broad, gland between lower pair; flowers axillary in few-flowered racemes or solitary; sepals 6–8 cm. long; petals 9–12 mm. long; perfect stamens 7, the 3 larger anthers erostrate; pods linear arcuate, slightly quadrate, 1–2 dm. long or longer, 5 mm. broad, the seeds longitudinal.—With the pulp of the pods as also with the infusion of the fresh leaves the natives purge themselves (Ruiz & Pavón). Section *Prososperma*. Illustrated, Britton & Brown, Ill. Fl. 2: 258; ed. 2. 2: 335.

Lima: Lurín and Huara, (*Ruiz & Pavón*).—Loreto: Yurimaguas, *Williams 4834; 4443*. Río Nanay, *Williams 257; 577*. Río Itaya, *Williams 130*. Near Iquitos, *Klug 1393; Williams 1305*. Warm regions. "Aya poroto," "canafistola cimarrona."

14. MARTIUSIA Benth.

Martia Benth.; *Martiodendron* Gleason.

Unarmed trees allied to *Cassia* technically but the leaves unequally pinnate, the stipules, bracts and bractlets promptly caducous, the sepals subvalvate or barely imbricate and the 4–5 subsessile stamens

with elongate unequal acuminate anthers. The genus may be known in flower by the long-acuminate buds and in fruit by the large thin flattened pods, the position of the solitary seed marked by a nerve that forks above the base of the pod which is wing-margined from base to apex. Gleason proposed a new name for the group in accord with the International Rules before the agreement to submit such name-conflicts to a committee or to propose them for conservation; cf. the analogous situation as regards *Apuleia*.

Dicorynia Benth., rather similar, has 3 petals, 2 unequal stamens but since of the northern Amazon region is scarcely to be expected. Its timber has value and it furnishes a resin used in the making of varnish (Ducke).

Martiusia elata Ducke, Archiv. Jard. Bot. Rio Jan. 3: 116. 1922. *Martiodendron macrocarpon* Gleason, Phytologia 1: 142. 1935.

Tree sometimes attaining 45 meters with ashy-white bark, large pyramidal more or less rusty-sericeous inflorescences, the flower buds as the puberulent anthers, long-acuminate; leaflets to 10 pairs, subcoriaceous, oblong-lanceolate, usually a dm. or so long, 3 cm. broad or narrower, finally glabrous; flower-buds to 1.5 cm. long, the oblong yellow soon deciduous petals 14 mm. long, the largest anthers slightly longer; pods 12–16 cm. long, 4.5–6 cm. broad, finely sericeous.—The Peruvian tree is forma *occidentalis* Ducke, Archiv. Inst. Biol. Veg. Rio Jan. 4: 14. 1936 (forma *angustifolia* Ducke, Leg. Amaz. Bras. 87. 1939), which is, according to Ducke, Gleason's species. F.M. Neg. 28199.

Río Acre: Near mouth of Río Macauhán, *Krukoff 5401*. Amazonian Brazil.

15. SCHIZOLOBIUM Vog.

Tall trees with the general character of *Caesalpinia* but the calyx segments only lightly imbricated, subequal, the ovary adnate and the pods samaroid-like with a solitary albuminous seed at the apex. Sepals reflexing, petals spreading, clawed.—The fruit simulates that of *Platypodium* while the leaflets suggest those of *Poeppigia*.

Schizolobium amazonicum Huber ex Ducke, Archiv. Jard. Bot. Rio Jan. 3: 117. 1922. *S. excelsum* Vog. var. *amazonicum* Ducke ex Williams, Field Mus. Bot. 15: 205. 1936.

Branchlets, petioles and ample panicles, at least the flower-buds, minutely puberulent but soon glabrous; leaves several dm. long, with 15–20 pairs of pinnae that usually bear 10–20 pairs or more of oblong leaflets, these firm, sparsely appressed strigillose beneath, rounded at both ends, usually 2–3 cm. long, 5–8 mm. wide; pedicels articulated above the middle to 6 mm. long or about as long as the calyx lobes; petals yellow, glabrous, oblong-obovate, 10–12 mm. long; pods rounded at tip, narrowed to the short stipe, 6–9 cm. long, to 3 cm. wide at the seed, rather rugosely nerved.—Attains 40 meters, buttressed at base. Inhabits, according to Ducke, terra firma, growing with great rapidity, the wood oatmeal-colored or almost white, very light. *S. parahybum* (Vel.) Blake (*S. excelsum* Vog.) of southern Brazil is frequently cultivated for ornament on the upper Amazon; it has larger flowers and fruits, the pedicels twice as long and not articulate.

Loreto: Río Nanay, *Williams 705*. Ucayali, *Huber 11522*.—Río Acre: Seringal San Francisco, *Ule 9444*. Mouth of Río Macauhán, *Krukoff 5567*. Amazonian Brazil. "Pashaco."

16. PARKINSONIA L.

Reference: Johnston, Contr. Gray Herb. 70: 61–63. 1924.

Slenderly branched trees or tall shrubs, the flowers in long racemes, the few extremely elongating leaf-pinnae appearing clustered by reason of the very short rachis, this apparently somewhat on a spine. Rachis of the pinnae flattened and irregularly lined, as it were, with few (rarely none) or sometimes a great many almost minute leaflets. Calyx lobes distinctly imbricate in bud. Pods terete and torulose (the Peruvian species).—Named for an English botanist, John Parkinson.

Ruiz suggested in his "Viaje" that "the leaf-stalks of this plant could be used for their flexibility, length and strength to make little baskets, mats and several other things especially if they were prepared as is esparto grass and flax."

Parkinsonia aculeata L. Sp. Pl. 375. 1753.

Leaves sessile, the rachis of the 2–4 pinnae usually 2–4 dm. long; leaflets oblong or sometimes narrower, 3–4 (6) mm. long; racemes axillary, the few yellow flowers loosely borne on slender pedicels about 1 cm. long, the petals nearly as long; pod turgid, constricted between the 1–several seeds, narrowed at both ends, 5–10 (15) cm.

long, less than 1 cm. thick.—Often cultivated in warm regions, at least in Argentina, for hedges; said to be native to tropical America. In Peru it belongs to the northern desert zone (Weberbauer, 153) and the lower Sierra zone (Weberbauer, 162). The Goodspeed collectors found it trailing to 3 meters on a flat dry mud plain and noted it as a good soil binder and also abundant on the dry flats from Trujillo to Chepén, where sometimes a shrub or tree to about 5 meters high. My specimens were from remotely scattered trees that appeared bizarre in flower and fruit in early October on the otherwise nearly sterile deep somewhat rocky desert sands of the Colorado Pampa. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 76.*

Piura: Talará, *Haught 18.* Negritos, *Haught F-65.*—Ica: Nazca, *Soukup 1308.*—Ancash: Los Zorros, 30 kilometers, of Huarmei, 100 meters, *Stork, Horton & Vargas 9195* (det. Johnst.). Near Casma, *2569.*—Lima: Between Torreblanca and Lima, *Ruiz & Pavón.*—Libertad: Often the only plant on these dry areas, Chepén, 100 meters, *Stork & Horton 10010* (det. Standl.). "Mataburro."

17. CERCIDIUM Tul.

Reference: Johnston, Contr. Gray Herb. 70: 61–68. 1924.

Shrubs or trees, the often tortuous branches usually armed with short spines, the bipinnate (sometimes apparently simply pinnate) leaves with 1–15 pairs of small leaflets. Rachis of pinnae borne below the spines. Flowers yellow in short corymbs or often in fasciculate racemes at the nodes of leafless branches. Bracts minute, the bractlets often wanting. Calyx-tube shortly campanulate (disk-like at base of young pods) on a stipe articulated with the slender pedicel, the 5 segments subequal, induplicate-valvate or valvate. Petals 5, oblong to orbicular, more or less clawed, imbricated, dissimilar. Stamens 10, free, lightly pilose below, the anthers versatile. Ovary stiped, attached obliquely or near base of calyx, the style involute. Pods narrowly oblong, plano-compressed, membranous or subcoriaceous, bivalved, the sutures nervelike, the valves obliquely veined. Seeds ovate, albuminous.

Cercidium praecox (R. & P.) Harms, Bot. Jahrb. 42: 91. 1908. *Caesalpinia praecox* R. & P. Fl. Peruv. 4: *pl. 376.* 1802. *Pomaria glauca* Cav. Descr. 466. 1802.

Bark bright green or that of the mostly leafless flowering branchlets greenish white or pale yellowish-green; nodose spines 2–10 mm. long; pinnae 1–2 (3) pairs with about 6 pairs of light green, glabrous

(or ashy-pubescent fide Johnston), oblong, obtuse or scarcely acute leaflets 3–4 mm. long, 1–1.5 mm. wide; racemes only a cm. or two long, 2–6-flowered, the puberulent or glabrate pedicels about 4 mm. long; calyx divisions yellowish, 6 mm. long, acutish, lightly puberulent; larger petals nearly 1 cm. long; pods shortly stiped, thin puberulent or glabrate, oblong or oblanceolate, 3–5 cm. long, 1 cm. wide. —Small tree 2–3 meters high, the bright yellow flowers with red spots on upper petals (West). Ascends to 1,600 (2,000) meters (Weberbauer).

Johnston has followed Harms in taking up a Ruiz & Pavón name definitely identified but which was published (in this case with analysis) only in the two or three known copies of plates to volume 4 of their *Flora;* elsewhere in this work as in Capparidaceae, Lauraceae, etc., I have adopted the same procedure. The type of *C. praecox* is from Guayaquil according to the data on the specimen at Madrid; its leaflets are not ashy-pubescent as described by Johnston, which may throw some question on the validity of *C. australe* Johnst. of Argentina, especially since *Venturi 1037* of Tucumán is ashy-pubescent. A photograph showing an association with this tree is in Weberbauer opposite page 155. F.M. Negs. 1636; 29427 (*Pomaria glauca*).

Lambayeque: Desert plain bordering Chiclayo Valley, 75 meters, *West 3576* (det. Johnst.). Pucala to Pampa Grande, *Raimondi.*—Piura: Amotape Hills, *Haught F-48.*—Cajamarca: Below Santa Cruz, 1,300 meters, (*Weberbauer 4155;* 189). Marañón Valley, 2,000 meters, *Weberbauer 4260;* 155.—Ayacucho: Mayoc to Huanta, *Raimondi.*—Libertad: Prov. Patás, *Raimondi.* To West Indies and Mexico. "Kalakel" (Weberbauer), "palo verde."

18. CAESALPINIA L.

Poinciana L.; *Guilandina* L.; *Biancaea* Todaro; *Hoffmanseggia* Cav.

Smooth or somewhat armed perennial herbs, shrubs, trees, or lianas, the stipules if present, simple or pinnate, the leaves bipinnate (their leaflets various in number, size and texture), the flowers yellow or red, often showy and in lax racemes in the upper axils or panicled at the tips of the branchlets. Bracts small or rarely large and membranous, bractlets wanting; calyx-tube short, the lower of the 5 imbricate or subvalvate or valvate segments often larger and concave or cymbiform, sometimes subequal. Petals 5,

orbicular spathulate or rarely oblong, sometimes dissimilar. Stamens 10, the filaments often villous or glandular, the anthers uniform, longitudinally dehiscent. Ovary shortly stiped, free, the style filiform. Pods usually compressed or flat but sometimes turgid, dehiscent or indehiscent, the suture nerviform or thicker, the albuminous or exalbuminous seeds often separated by tissue.—Burkart in his scholarly account of the species of Argentina and Uruguay, Revista Agron. 3: 67–112. 1936, has called attention, l.c. 75, to the inconstancy of the calyx character, some species having valvate calyx divisions that would place them, except for habit, in *Hoffmanseggia;* the latter and later name therefore may be suppressed as already done by Baillon and Fisher.

Genus important for the tannin content of the fruit of a number of species, notably the Peruvian tara (*C. spinosa*), which yields 43–51 per cent and is cultivated in Africa; cf. Chevalier, Rev. Bot. Appl. et Agric. Trop. 9 (93): 298–302; 9 (94): 377–381. 1929. According to an anonymous note in Bol. Mus. Hist. Nat. "Javier Prado," Lima, 5: 282. 1941, *C. spinosa* is twice as rich in tannin as are European species; the solution prepared for use changes the color of leather very little but is effective; the writer recommends its cultivation for export. This would appear to be feasible since Wattle (Mimosa) bark of Australia, widely cultivated elsewhere, has a tannin content of only 35 per cent. It is found nearly everywhere in Peru to about 3,500 meters.

Stamens 4–6 cm. long; pedicels 4 cm. long, much longer in fruit; leaflets many.

Leaflets 2–3 mm. wide.....*C. Gilliesii.*

Leaflets 6–10 mm. wide.....*C. pulcherrima.*

Stamens and pedicels much shorter.

Calyx segments unequal and more or less imbricate; plants tall.

Leaflets, at least mostly, only 4–8 mm. wide.

Pods rather thick; prickles few or none; flowers to 9 mm. long. *C. Paipai.*

Pods compressed; flowers to 17 mm. long.

Leaflets glabrous; prickles few.....*C. cassioides.*

Leaflets pilose beneath; prickles many.....*C. sepiaria.*

Leaflets, at least mostly, (8) 10–12 mm. wide or wider.

Leaflets 3 cm. long or shorter; pods unarmed.

Sepals entire.....*C. cassioides.*

Sepals fringed-dentate.....*C. spinosa.*
Leaflets 4 cm. long or longer; pods prickly.....*C. Bonduc.*
Calyx segments subequal, valvate; plants low.
Densely glutinous-glandular even to the leaves, these ternately bipinnate.....*C. ternata.*
Stipitate-glandular if at all, at least not the bipinnate leaves.
Stipules fimbriate-glandular or deeply lacerate.
Stipules eglandular, conspicuous; pods glabrous.
C. stipulata.
Stipules glandular as also the bracts; pods tomentose.
C. miranda.
Stipules entire, or slightly glandular, small, caducous as also the bracts.
Plants branching, more or less.
Flowers 5–6 mm. long; pods 4–5 mm. wide...*C. viscosa.*
Flowers 10–12 mm. long; pods about 6 mm. wide.
C. egena.
Plants cespitose or strict, eglandular unless above.
Plants eglandular; pinnae usually 3 pairs...*C. prostrata.*
Plants glandular above; pinnae 4–5 pairs...*C. chicamana.*

Caesalpinia Bonduc (L.) Roxb. Fl. Ind. 2: 362. 1832 (cf. Dandy & Exell in Journ. Bot. 76: 175. 1938); 65. *Guilandina Bonduc* L. Sp. Pl. 1: 381. 1753. *C. Crista* L. l.c. 380, in part. *G. bonducella* L. Sp. Pl. ed. 2. 1: 545. 1762. *C. bonducella* (L.) Fleming, As. Res. 11: 159. 1810.

Climbing or clambering slightly pubescent prickly shrub, the prickles on branchlets and leaves recurved; stipules apparently wanting; leaflets 5–8 pairs, elliptic, obtuse, puberulent beneath, lustrous above, 2–5 cm. long, 1.5–2.5 cm. broad; racemes narrow, elongate, tomentulose, the yellowish flowers on pedicels only a few mm. long; stamens shorter than the spathulate petals, these about 1 cm. long, the puberulent sepals 6 mm. long; pods suborbicular or ovate, compressed, usually bristly, 5–10 cm. long, 3–5 cm. broad with 1 or 2 subglobose yellow exalbuminous seeds.—*C. Crista* L., similar, is said to differ in being provided with 1–3 foliate subpersisting "pseudostipules" (Goebel); the pods are ovate-oblong, the seeds (Nicher beans) gray or lead-colored. Both species illustrated, Degener, Fl. Hawaii.

Peru: Without locality, probably cultivated, *Ruiz & Pavón*. Warm regions.

Caesalpinia cassioides Willd. Enum. Hort. Berol. 1: 444. 1809. *C. insignis* (Kunth) Spreng. Syst. 2: 344. 1825. *Poinciana insignis* Kunth, Mimoseae 147. *pl. 44*. 1820. *Caesalpinia bicolor* C. H. Wright, Kew Bull. 22. 1896. *C. Andreana* Micheli, Journ. Bot. 6: 193. 1892. *C. Pardoana* Harms, Bot. Jahrb. 42: 92. 1908.

Glabrous shrub or small tree, the virgate branchlets sparsely armed with rather stout, somewhat recurved prickles; pinnae 2–5 pairs; leaflets broadly elliptic, or nearly subrotund, sometimes slightly obovate, rounded at both ends or retuse, usually 2–2.5 cm. long, 1.5 to nearly 2 cm. broad, rigid-chartaceous, opaque; racemes terminal, few-flowered, the pedicels 6–8 mm. long, the glandular-punctate calyx segments subequal and 7 mm. long except the lower, this 10–12 mm. long, concave, spreading, caducous; petals orange with red or purple veins, about 15 mm. long; stamens nearly 2 cm. long; pods glabrous, stiped, compressed, the ventral margin straight, the dorsal falcate, 4 cm. long, about 1.5 cm. broad.—Harms suggested, l.c., that connecting forms might be found between the type of his species and that of Kunth; my *1342* seems to represent such a transitional state, the leaflets on one flowering branch being similar to those of *C. cassioides*. However, the latter as to type has 2 pairs of pinnae so it may be worth while to designate as var. **Pardoana** (Harms) Macbr., comb. nov., the plant with 3–5 pairs of pinnae, the flowers sometimes 2 cm. long, the leaflets usually scarcely 1 cm. broad. The variety commemorates the name of a former president of Peru. F.M. Negs. 1780; 1792 (*C. Pardoana*).

Cajamarca: Jaén, *Weberbauer 6183* (det. Harms). Prov. Jaén, at the mouth of the Río Chinchipe, *Bonpland*, type. Between Balsas and Celendín, (*Weberbauer 4252*, det. Harms, *C. insignis*).—Ancash: Huaraz, 2,600 meters, *Weberbauer 3258;* 173 (type, *C. Pardoana*).—Huánuco: Ambo, sprawling shrub in sliderock, *3162* (det. Harms, *C. Pardoana*).—Junín: Huartas, in round spreading clumps on rocky slopes, *1342* (det. Harms, *C. Pardoana*).—Amazonas: Chachapoyas, (*Lobb*, type, *C. bicolor*).—San Martín: Vitoc, (*Maclean*, det. Wright, *C. bicolor*). Colombia. "Anicullo," "brasil."

Caesalpinia chicamana Killip & Macbr., spec. nov.

C. prostrata affinis; stipulis scariosis circa 3 mm. longis eglandulosis; caulibus petiolisque crispe pilosis et sparse stipitato-glandulosis;

pinnis 4–5 jugis; foliolis fere glabris; pedunculis 2–10 cm. longis; bracteis caducissimis; calycibus sordide villosulis et plus minusve glandulosis fere 1 cm. longis, laciniis membranaceis anguste oblongis; petalis circa 12 mm. longis integris solum ad basin densissime glandulosis.—Like the related species in this group (*C. falcaria, C. prostrata, C. viscosa*) not very distinctive but from the material at hand apparently merits recognition.

Libertad: Chicama Valley, *Smyth 74* (type, U. S. Nat. Mus.).

Caesalpinia egena Macbr., comb. nov. *Hoffmanseggia viscosa* (R. & P.) H. & A. var. *egena* Macbr. Field Mus. Bot. 8: 93. 1930.

Like *C. viscosa* but apparently constantly with much larger flowers; petals 10–12 mm. long, 4 with claw 2 mm. long, 1 with claw 5 mm. long, all glabrous or obscurely glandular; stems scarcely at all glandular punctate; leaves glabrous, glaucous; filaments densely glandular nearly to tips, pilose below; pods about 6 mm. broad.—Nearly *C. falcaria* (Cav.) Fisher but the calyx glabrous instead of ashy puberulent; cf. note under *C. viscosa*.

Arequipa: Tiabaya, 2,100 meters, *Pennell 13073*.—Moquehua: Mt. Estuquiña, rainy-green formation, *Weberbauer 7419A*, type.

Caesalpinia Gilliesii [Hook.] Wall. ex Hook. Bot. Misc. 1: 129. *pl. 34*, as synonym. 1829. *Poinciana Gilliesii* Hook. l.c. *Erythrostemon Gilliesii* (Wall.) Klotzsch, in Link, Klotzsch & Otto, Ic. Pl. 2: 97. 1844.

Well marked by the simple terminal many-flowered racemes of large flowers conspicuous especially because of the long-exserted red stamens, the petals yellowish, 2–3 cm. long; pinnae 7–14 pairs with 6–10 pairs of elliptic glabrous membranous scarcely acutish leaflets, mostly 5–10 mm. long, 2–3 mm. broad; branchlet tips, pedicels and calyces conspicuously glandular; fruiting pedicels to 2.5 cm. long; pods 7–10 cm. long, 1.5–2 cm. broad, punctate-glandular, pubescent on the margin.—Shrub 1–3 meters high. Much cultivated in warm regions and in English-speaking countries known as "bird of paradise." Sandeman, in his "A Forgotten River" 100, 1929, notes that *C. Gilliesii* with lemon-colored flowers and bright crimson stamens is much used as a hedge plant in the neighborhood of Lima. It was also observed by Mathews in cultivation. Illustrated, Bot. Mag. *pl. 4006*.

Peru (cultivated). Argentina; Uruguay.

Caesalpinia miranda (Sandw.) Macbr., comb. nov. *Hoffmanseggia miranda* Sandw. Kew Bull. 99. 1934.

Low shrub, the ultimate branchlets slender, obscurely angled, more or less ashy-pubescent with very few stipitate glands intermixed; stipules lanceolate-subulate, pilose, 3–5 mm. long, the margins and tips strikingly fimbriate with long stiped glands, the caducous bracts similarly pubescent, 4–5 mm. long; pinnae 3–5 pairs, with 3–5 pairs of oblong or obovate-oblong leaflets, obliquely rounded or subcordate at base, broadly rounded at tip, 2–6.5 mm. long, 1.5–4 mm. wide, rigid, eglandular, pilose both sides and prominently venose especially beneath; racemes elongate, densely stipitate glutinous-glandular, the recurving pedicels 3–4 mm. long; calyx lobes 6–8 mm. long; petals 11–13 mm. long, glabrous but conspicuously margined with black eglandular filiform appendages to 2 mm. long; stamens 10, pilose especially toward the base; pods densely tomentose, 1 cm. long, 2 mm. broad.

Arequipa: Mollendo, (*Stafford K53*, type); *Hitchcock 18982; 22408.*

Caesalpinia Paipai R. & P. Fl. Peruv. 4: *pl. 375.* 1802. *C. glabrata* HBK. Nov. Gen. & Sp. 6: 326. 1824. *C. corymbosa* Benth. Pl. Hartw. 117. 1843. *Libidibia corymbosa* (Benth.) Britton & Killip, Ann. N. Y. Acad. Sci. 35: 189. 1936.

Unarmed shrub or low tree, typically glabrous except for the branchlet tips and the more or less corymbose inflorescence, this shorter than the leaves; pinnae 3–8 pairs; leaflets 4–10 pairs, oblong-elliptic, quite obtuse, ordinarily about 8 mm. long, 3–4 mm. broad; bracts minute; pedicels 6–8 mm. long, the yellow flowers about as long, the stamens slightly exserted, villous at base; pods shortly stiped, 7 cm. long or longer, 12–14 mm. thick, rather fleshy-coriaceous and somewhat torulose.—Gray wrote, regarding the Wilkes' specimen, "apparently intermediate between the *C. glabrata* and *C. corymbosa* which may with probable reason be united." *Weberbauer 5994*, which was designated in herbaria as a new species, may become var. **pubens** Macbr., var. nov., ubique puberulis praecipue foliolis subtus. Following precedent (cf. *Cercidium*) I adopt the name of Ruiz and Pavón published with floral analysis; the authors noted in their journal, "luxuriant tree valued in carpentry for the strength of its wood, its pods used for a black dye and to make a very good ink."

Cajamarca: Magdalena, *Bonpland* (type, *C. glabrata*). Nancho, (*Raimondi*).—Piura: Near Serrán, 200 meters, *Weberbauer 5994* (type the var.). Cerro Prieto, Amotape Hills, *Haught F103*. Río Quirros, (*Raimondi*).—Ancash: Santa, (*Raimondi*).—Libertad: Trujillo, (*Raimondi*).—Lima: Chancay and Huara, *Ruiz & Pavón*, type. Near Obrajillo, (*Wilkes Exped.*).—Amazonas: Bagua, (*Raimondi*).—Loreto: 10-meter tree in clearing, *Killip & Smith 26922*. Ecuador. "Charán," "chara," "pai-pai," "paypay" (Raimondi).

Caesalpinia prostrata (Lag.) Macbr., comb. nov. *Hoffmanseggia prostrata* Lag. ex DC. Prodr. 2: 485. 1825. *Larrea gracilis* R. & P. Fl. Peruv. 4: *pl. 377*. 1802, not *C. gracilis* Benth. *Hoffmanseggia gracilis* (R. & P.) H. & A. in Hook. Bot. Misc. 3: 209. 1833. *H. pilosa* [R. & P.] G. Don, Gen. Syst. 2: 434. 1832.

Cespitose, lightly ashy-villous perennial, the subequal leaves and long-peduncled racemes prostrate or ascending from a simple or little-branched lignescent caudex; stipules lanceolate-acuminate, strongly striate, entire; pinnae 2–6 pairs, with 4–6 pairs of oblong-elliptic evenose obtuse leaflets, mostly 7 mm. long, about 2 mm. broad; racemes to 15 cm. long, the flowering portion scarcely a third as long; pedicels 3–4 mm. long; calyx 6 mm. long, slightly exceeded by the orange or orange-red, sometimes spotted petals, the stamens included; pods ashy-puberulent, nearly straight, 3 cm. long, 4 mm. broad or somewhat larger.—There is no glandular pubescence. *C. falcaria* (Cav.) Fisher is branching and glandular above. Grows in sandy open places. F.M. Neg. 29418.

Lima: Surco, *Ruiz & Pavón*.—Arequipa: Tingo, 2,200 meters, *Pennell 13120*. Near Arequipa, south of Mollendo, salty nitrate soil, bushy perennial, *Pennell 13175;* back of beach, *Eyerdam 25169* (det. Johnston). Atico and Atiquipa, (*Raimondi*). Tiabaya, *Pennell 13082*.—Moquehua: Torata, open mixed formation, *Weberbauer 7419*. Chile.

Caesalpinia pulcherrima (L.) Swartz, Obs. Bot. 166. 1791; 67. *Poinciana pulcherrima* L. Sp. Pl. 380. 1753.

Completely glabrous more or less glaucous sparsely prickly shrub or small tree with ample 5–9 pinnate leaves and elongate axillary and terminal racemes of showy yellow, orange or red flowers with long-exserted often scarlet stamens that are borne on very long slender pedicels; stipules caducous, pinnate; pinnae 1–3 dm. long, with 6–12 pairs of subsessile oblong leaflets, oblique at base, rounded

and mucronate at tip, thin, paler beneath, commonly about 2 cm. long, 12 mm. wide; pedicels to 9 cm. long; lower larger sepal 1.5 cm. long; petals red (or yellow), about 2–2.5 cm., crisped on margin, 4 cuneately clawed, the upper middle one with long claw and greatly reduced, often tubular; stamens to 6 cm. long; pod obliquely oblong, acuminate, 6–12 cm. long to 2 cm. broad, dehiscing, the 6–8 separated seeds albuminous (Benth.).—Commonly cultivated in the tropics, the native region unknown. The false Poinciana, *Delonix regia* (Boyer) Raf., a much larger tree with sepals valvate, oblong, subequal, stamens shorter than petals, these pubescent at the subequal claws, numerous pinnae, the small leaflets puberulent beneath, the pods very large, is to be expected; native to Madagascar it is often cultivated in warm regions as the "Flame Tree" or the "Poinciana." Illustrated, Degener, Fl. Hawaii.

San Martín: Tarapoto, *Williams 5475*. Shapaja, (*Sandeman*). Pongo de Cainarachi, *Klug 2605*.—Loreto: Río Nanay, *Williams 411*. Leticia, *Williams 3060*. Río Itaya, *Williams 214*.—Puno: *Soukup 330*. Tropical regions. "Angel sisa," "huaika sisal."

Caesalpinia sepiaria Roxb. Fl. Ind. 2, pt. 2: 360. 1832. *Biancaea sepiaria* (Roxb.) Todaro, Hort. Bot. Panorm. 3. 1876.

Spreading or straggling shrub, prickly even to the puberulent tapering rachis of the 4–10 pinnate leaves, these to several dm. long, the pinnae with 7–12 pairs of oblong or slightly obovate-elliptic leaflets, rounded at apex, oblique at base, 10–15 (20) mm. long, lightly pilose beneath or glabrate; flowers pale yellow, somewhat pendent, borne in axillary or terminal racemes 2 dm. long or longer; calyx-tube 2 mm. long, the lobes more than twice as long, the lowest one concave and slightly larger; petals unequal, 9 and 12 mm. long, 4 and 8 mm. wide; stamens about 12 mm. long; pods oblong, nearly straight, glabrous, coriaceous, 5–9 cm. long, about 2 cm. wide with 4–8 seeds, these black, marked with yellowish-brown.—The prickles on the leaves are recurved. Often naturalized in warm regions. Illustrated, Degener, Fl. Hawaii.

Lima: Rimac Valley near Lima, 100 meters, *Grant 7414*. India.

Caesalpinia spinosa (Molina) Kuntze, Rev. Gen. 3, pt. 2: 54. 1898. *Poinciana spinosa* Molina, Sagg. Nat. Chile 158. 1782. *C. Tara* R. & P. Fl. Peruv. 4. *pl. 374*. 1802. *C. pectinata* Cav. Descr. 467. 1802. *Coulteria tinctoria* HBK. Nov. Gen. & Sp. 6: 261. *pl. 569*. 1824. *Caesalpinia tinctoria* (HBK.) Dombey ex DC. in syn., Prodr.

2: 481. 1825. *Tara spinosa* (Molina) Britton & Rose, N. Amer. Fl. 23: 320. 1930.

Stocky shrub or tree with spreading spinose gray-barked densely leafy branchlets and narrow racemes of reddish-yellow flowers; leaves smooth or sparsely and shortly prickly with 2–3 pairs of pinnae, these often 1 dm. long and with about 8 pairs of subsessile firm reticulate-veined oblong-elliptic glabrous leaflets (or these obscurely puberulent beneath as the rachi), oblique at base, rounded at apex, commonly about 2.5 cm. long, 1 cm. wide; racemes 8–12 cm. long, the puberulent pedicels 5 mm. long, articulate below the short calyx-tube; larger calyx segments serrulate, about 6 mm. long, the petals less than twice as long, about as long as the stamens; pods often red or reddish.

Commonly planted for tanning (cf. generic description) and as a source of a dye. Powder within the pod used as an eye wash (K. & S.). The names of Molina when identified without doubt should be accepted; cf. Johnston, Contr. Gray Herb. 70: 90–91. 1924, for well-taken observations on this matter.

Lima: Chosica, along irrigation ditch, *Mexia 04004*. Atocongo, among large rocks, 10 meters high, *Mexia 04048*. Matucana, *265*. Prov. Cañete, *Vargas 9311*.—Huánuco: *Dombey*. Conchamarca, *Woytkowski 132*. Ambo, *Sawada P105*.—Junín: Tarma, *Killip & Smith 21852*.—Ayacucho: Huanta, *Killip & Smith 23331*.—Cuzco: *Herrera 3432; 1519*. San Sebastian, *Pennell 13627*.—Tacna: *Rusby 2358*. "Tara," "tanino," "algarroba," "taya."

Caesalpinia stipulata (Sandw.) Macbr., comb. nov. *Hoffmanseggia stipulata* Sandw. Kew Bull. 181. 1939.

A low shrub, in many respects similar to *C. miranda* but the strongly imbricate stipules eglandular, 5–8.5 mm. long, usually 3–5 mm. broad, regularly and deeply toothed; leaflets 5–9 pairs, suborbicular to obovate-oblong, glabrous or rarely sparsely ciliate; pedicels glabrous as the calyces except at tip; petal appendages white; pods glabrous, more than 2.5 cm. long, 7 mm. broad.—Lacks the glandulosity of *C. miranda*. Three to 6 meters high in sandy dips on open hillsides, the flowers orange.

Arequipa: Mejia, south of Mollendo, (*Stafford 899*, type).

Caesalpinia ternata (Phil.) Macbr., comb. nov. *Hoffmanseggia ternata* Phil. Anal. Mus. Nac. Chile, Bot. 79: 19. 1891.

Intricately and flexuosely branched under-shrub, especially the branchlets inordinately glutinous-glandular; leaves ternate, the 3 pinnae with 5 pairs of oblong-elliptic obtuse leaflets, 4–6 mm. long, 2–3 mm. broad, more or less glandular, ciliate; racemes 2–3 cm. long, little if at all exceeding the leaves, the few flowers on pedicels 2–3 mm. long, longer in fruit and reflexing; calyces 3 mm. long, the flame-colored petals twice as long; pods falcate to 3 cm. long, 4 mm. broad, glandular.

Tacna: Near Tacna, 650 meters, *Werdermann 719*. Chile.

Caesalpinia viscosa (R. & P.) Macbr., comb. nov. *Larrea viscosa* R. & P. Fl. Peruv. 4: *pl. 377*. 1802. *Hoffmanseggia viscosa* H. & A. in Hook. Bot. Misc. 3: 209. 1833.

Much branched, the curved or flexuous ascending branchlets densely stipitate glandular, the leaflets glabrous or typically marginally glandular, oblong-elliptic, rounded both ends, glaucous, usually 4–5 mm. long, about half as broad, commonly about 6 pairs on 3 pairs of pinnae; racemes exceeding the leaves, the slender pedicels several mm. long; calyces glabrous or nearly, 3 mm. long, the entire subequal (1 with longer narrower claw) petals about twice as long, glabrous or with a few marginal glands; stamens included, medially glandular and pilose toward the base; pods falcate, glandular, the margins more or less pilose, 2–2.5 cm. long, scarcely or barely 5 mm. broad, falcate.—*C. falcaria* (Cav.) Fisher, Bot. Gaz. 18: 122. 1893, of Bolivia and Patagonia is eglandular below, typically at least more herbaceous, and the falcate pods are somewhat broader. A specimen from Yura, Department of Arequipa, collected by Karl Schmidt is probably an undescribed related species but is without flowers or fruit, glands lacking, the leaflets ashy-puberulent beneath.

Piura: Paita, shale cliff above sea, *Pennell 14818; Cockerell.* Pariñas Valley, *Haught F118*.—Lima: Quive, open rocky slope, *Pennell 14306*. Chosica, rocky gulch, *491; 2867; Mexia 04006* (det. Johnst.). Yangas, *Wilkes Exped.* Near Lima, *Ruiz & Pavón; Dombey*.—Huancavelica: Below Surcubamba, *Weberbauer 6487*.—Apurímac: 2,300 meters, *Weberbauer 5857*.

19. PHYLLOCARPUS Riedel.

An unarmed tree with abruptly pinnate leaves and showy purple flowers with only 2 petals borne in short racemes often fasciculate at the nodes of leafless branchlets. Bracts and bractlets promptly caducous. Calyx-tube very short, the limb segments 4,

imbricate. Stamens diadelphous, the uniform anthers versatile. Ovary stiped, the filiform style slightly clavate at tip. Pod oblong, subfalcate, plano-compressed, thin, the upper suture narrowly winged, the medially placed seed exalbuminous.—Pods simulate those of *Derris* and *Platycyamus*. A beautiful tree when covered with flowers, the foliage then lacking; wood white, spongy, without value (Ducke).

Phyllocarpus Riedelii Tul. Ann. Sci. Nat. sér. 2. 20: 143. 1843; 62.

Young branchlets, petioles and racemes except the colored calyces minutely rusty tomentulose; leaflets 6–8 pairs, opposite, subsessile, oblong-elliptic, rounded both ends, slightly puberulent or glabrate, lustrous above, mostly about 3 cm. long, 2 cm. wide; calyx segments orbicular-concave, strongly imbricate, 6–7 mm. long; 2 lateral petals obovate, equaling the calyx, the lower reduced or wanting; stamens about twice as long as the calyx, 9 connate above the middle; ovary glabrous; pod 8–10 cm. long, 3.5–4 cm. wide including the narrow wing, reticulate-veiny.—Bentham, l.c., gives in synonymy *P. pterocarpus* Riedel ex Walp. Bot. Rep. 1: 803. 1842, but the name actually does not occur there or in Endl. Gen. Suppl. 2: 97. 1842, as indicated by Kew Index. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 19*.

Río Acre: Seringal Auristella, *Ule 9447; 9448* (det. Harms). Río Macauhán, terra firma, *Krukoff 5651*. Brazil.

20. DICYMBE Spruce

Trees with abruptly or subimparipinnate leaves (the leaflets coriaceous) and corymbose paniculate white or roseate flowers, these completely enclosed before anthesis by the fleshy coriaceous bractlets. Calyx-tube turbinate, thick, the 4 divisions imbricate, often bifid apically. Petals 5, subequal, imbricate. Stamens 10, free, the filaments pilose at base, the anthers uniform, linear, longitudinally dehiscent. Ovary shortly stiped, free, several-ovuled, the style elongate with peltate stigma. Pods compressed.—*Thylacanthus* Tul. (*T. ferrugineus* Tul., 60) of the Amazonian valley is similar apparently but the bractlets are spreading at anthesis, the flowers yellow, the filaments connate at base.

Dicymbe amazonica Ducke, Archiv. Inst. Biol. Veg. Rio Jan. 15. 1938.

Branchlets terete, the younger more or less ashy-puberulent as the inflorescence and leaflets beneath, the last 2–4 or sometimes

5 or 7 pairs, the glabrous petiolules 4–5 mm. long, the blades lanceolate-ovate or oblong, usually rounded or obtuse at base, long and rather abruptly acuminate, subcoriaceous, scarcely lustrous, concolored, usually 8 cm. long, half as broad, the nerves slender, the veins subobsolete; pedicels 10–12 mm. long, densely villous; bractlets densely ashy-sericeous to 15 mm. long, 8 mm. broad; flowers white, the glabrous calyx-tube 4 mm. long, the glabrous sepals about 3 times as long, the inner 2 oblong; petals 25–32 mm. long, 12–18 mm. broad at tip, obovate, long-clawed, in bud lineately pilose, after anthesis the pilosity only on the claw and sparse; pods (immature) 12 cm. long, 2.5 cm. broad, plano-compressed, ligneous, rusty-tomentose, subsessile, strongly inequilateral at base, obliquely subacute at apex, the upper suture elevated.—Type from São Paulo de Olivença. The other Amazonian species is *D. corymbosa* Spruce, 60, the leaflets only 2 pairs.

Peru (probably). Brazil.

21. SCLEROLOBIUM Vog.

Trees with oddly or subabruptly pinnate leaves, the opposite leaflets rather large, coriaceous or thick, and small, usually abundant yellow or white flowers borne densely in paniculate racemes or spikes. Stipules small or sometimes subpersisting and foliaceous, often foliate or pectinate. Bracts minute, more or less caducous, the bractlets wanting. Calyx campanulate with 5 subequal imbricate sepals. Petals filiform, linear or narrowly obovate, glabrous or pilose. Stamens 10, free, the equal or unequal filaments often villous below, the anthers longitudinally cleft, versatile. Ovary few-ovuled, shortly stiped, the stipe free, the filiform style with terminal stigma. Pod flat, sometimes wing-margined, indehiscent, ovate or oblong, the 1–few compressed seeds with thin albumin and thin foliaceous cotyledons (Amshoff).

Petals glabrous unless at base.

Leaves at least the newer lustrous beneath by the dense fine appressed indument; stipules caducous.

Flowers sessile.....*S. chrysophyllum.*

Flowers pedicellate.....*S. paniculatum.*

Leaves glabrate or at least not lustrously pubescent; stipules pectinate.

Leaves more or less acuminate, concolor.....*S. tinctorium.*

Leaves acute, bicolor by the dense puberulence.....*S. rigidum.*

Petals densely pilose or villous; stipules foliaceous.

Flowers subsessile, the pedicels little if at all exceeding 0.5 mm.; leaflets several pairs.....*S. setiferum.*

Flowers pedicellate, the pedicels at least 1 mm. long; leaflets 2–3 pairs in type.....*S. hypoleucum.*

Sclerolobium chrysophyllum Poepp. & Endl. Nov. Gen. & Sp. 3: 60. *pl. 266.* 1845; 49.

Branchlets and petioles more or less sulcately angled, the latter sometimes inflated toward the base, early rusty-puberulent but soon glabrous; leaflets 4–8 pairs, nearly oblong, strongly oblique at base, shortly acuminate, lustrous and glabrous above or sparsely and obscurely puberulent, densely appressed sericeous beneath with fine often yellow trichomes, mostly 12–15 cm. long, 4–5 cm. broad, the stout petiolules about 5 mm. long; spikes densely panicled, the ashy or rusty-appressed sericeous calyces subsessile, about 4 mm. long; petals linear, glabrous; filaments pilose; pods oblong, subligneous.—Tree to 30 meters with dense ovate crown (Poeppig). *S. physophorum* Huber, Bol. Mus. Goeldi 6: 80. 1909, is described as having the lower leaflets cordate at base, all abruptly caudate-acuminate, the petioles strongly inflated. Inasmuch as the petiole character is present on the Poeppig specimen the validity of Huber's species may be open to question. F.M. Neg. 1799.

Loreto: Middle Ucayali, *Tessmann 5429* (det. Harms).—Río Acre: Mouth of Río Macauhán, *Krukoff 5469.* Brazil.

Sclerolobium hypoleucum Benth. in Mart. Fl. Bras. 15, pt. 2: 48. 1870.

Branchlets and petioles minutely ashy-tomentulose, soon glabrate; stipules foliaceous, broadly ovate, sometimes 3 foliolate, the terminal 12–18 mm. long and nearly as broad, the lateral smaller or lacking; leaflets 2–3 pairs, slenderly petiolulate, ovate, rounded at base, acuminate, mostly 5–10 cm. long, 4–8 cm. broad, becoming coriaceous, glabrous and lustrous above, early lustrous, ashy-sericeous beneath but the fine trichomes deciduous in age revealing the close reticulate venation; spikes panicled, divaricate, the distinctly pediceled but crowded flowers very fragrant, their filiform petals long-pilose; calyx scarcely 4 mm. long, sericeous pubescent; filaments exserted, pilose at base; pods oval, 3.5–4 cm. long, 2.5 cm. broad, with 1 seed.—Tree 10–15 meters with dense crown (Spruce). Related Amazonian species include *S. odoratissima* Spruce ex Benth., 48, leaflets

concolor, only minutely and sparsely pubescent beneath, 4–6 pairs, oblong; *S. paraense* Huber, Bol. Mus. Goeldi 6: 79. 1909, similar but the glabrous leaflets 2–4 pairs, lanceolate-oblong to 6 cm. wide, three times longer; much like it is *S. melanocarpum* Ducke, Archiv. Inst. Biol. Veg. Rio Jan. 2: 43. 1935, but stipules lacking, petioles grooved, leaflets 4–6 pairs, obovate-oblong, a third shorter, the petal trichomes long, crisped, yellow. Finally there is *S. eriopetalum* Ducke, l.c. 41, with golden pilose petals but the leaflets of *S. paniculatum* except that they are more rigid and yellowish beneath. F.M. Neg. 1804.

Peru (perhaps). Amazonian Brazil.

Sclerolobium paniculatum Vog. Linnaea 11: 397. 1837; 47.

Large tree, the well-petioled leaves with usually 4–6 pairs of oblong-elliptic or ovate-oblong-lanceolate thickish leaflets that are densely, usually lustrously, appressed sericeous villous beneath, finally glabrate and green above, oblique at base, acute, commonly 7–10 cm. long, 3–5 cm. wide; pedicels to 2 mm. long, ashy-tomentose-pilose as the shorter calyces, these with ovate obtuse lobes twice as long as the cupulate tube; petals filiform, glabrous, little exserted, the filaments more conspicuous by virtue of their dense pilosity; ovary silky-pilose equaled or exceeded by the glabrous style; pods often oblong, blunt both ends, glaucescent, 14–16 mm. wide to 5 cm. long when 2-seeded, when 1-seeded shorter and the wing-like margin about equal both ends.—According to Williams the bark is reddish-brown, the durable timber used for house-posts and construction. *S. Goeldianum* Huber, Bol. Mus. Goeldi 6: 78. 1909, might be sought here; its leaflets are little oblique at the rounded base, finally glabrescent. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 12.*

San Martín: Tarapoto, *Spruce 4942; Williams 5701* (det. Harms). Lamas, *Belshaw 3477.* Brazil; Dutch Guiana. "Ucsha-cuiro."

Sclerolobium rigidum Macbr., sp. nov.

Arbor 8 m. alta ramulis paullo angulatis, junioribus breviter ferrugineo-hirsutulis demum glabratis; stipulis subpersistentibus setaceo-pectinatis ad 12 mm. longis; petiolis valde canaliculatis; foliolis circa 4–5-jugis crasse petiolulatis (petiolulis 5–7 mm. longis cum rhachidibus dense ferrugineo-hirsutulis) fere oblongis basi valde inaequilateris apice obtusis vel breviter acuminatis ad 15 cm. longis, 5 cm. latis, rigide coriaceis supra subglabris nitidis subtus dense cano fulvo-sericeo-pubescentibus vix vel haud nitentibus et

ad nervos ferrugineo-hirsutulis, nervis prominentibus imprimis subtus venulis reticulatis paullo notatis; paniculis dense rufo-velutino-hirsutulis amplis; floribus sessilibus, sepalis molliter pubescentibus 4 mm. longis, petalis filiformibus glabris 3 mm. longis; filamentis ad basin aureo-hirsutis; ovario libro aureo-hispido.—Apparently related to *S. bracteosum* Harms, Verh. Bot. Ver. Brandenb. 48: 167. 1907, with leaflets half as broad as long, stipules caducous, bracts subpersistent conspicuously exceeding the flowers.

Loreto: Pomayacu, 1,000 meters, *Klug 3239*, type.

Sclerolobium setiferum Ducke, Archiv. Inst. Biol. Veg. Rio Jan. 2: 42. 1935.

A large tree with striately sulcate branchlets, the younger finely ashy-pubescent as the narrowly canaliculate petioles and rachi becoming glabrate; stipules foliaceous, subpersisting with several strongly revolute rather broad divisions; leaflets 7–9 pairs (petiolules 5–9 mm. long), oblong, rounded and scarcely if at all inequilateral at base, usually shortly acuminate to 13 cm. long, 3.5 cm. broad, coriaceous, glabrate above, densely appressed tomentulose beneath, the indument at first yellowish, finally canescent; veins prominent, reticulate beneath, the nerves impressed above; flowers sessile or subsessile, the ashy sericeous calyx to 4 mm. long, the linear petals densely yellow-tomentose; filaments pubescent at base with rigid reflexed yellowish setae.—*S. subbullatum* Ducke, l.c., has concolor leaflets, hispidulous on the nerves and veins beneath, the stamens long yellowish-pilose nearly to the tips, the petals sparsely so. Also to be expected (found as near Peru as São Paulo de Olivença) is *S. amplifolium* Ducke, l.c. 43, leaflets mostly 15 cm. long, 6 cm. broad or larger, densely sericeous beneath, the petals and filaments yellow-pilose. *S. Herthae* Harms, Notizbl. Bot. Gart. Berlin 15: 46. 1940, of Ecuador is compared by the author to *S. amplifolium* but leaflets not at all lustrous beneath (they are scarcely so however in Ducke's species, at least the mature ones), 7–15 cm. long, 2–5 cm. wide, puberulent on the nerves beneath, pilose on the nerves above, but the flowers are 4 mm. long, golden yellow, larger than those of *S. eriopetalum* Ducke.

Río Acre: Seringal Iracema, (*Ducke*). Brazil.

Sclerolobium tinctorium Benth. in Hook. Journ. Bot. Misc. 2: 236. 1850; 49. *S. Uleanum* Harms, Verh. Bot. Ver. Brandenb. 48: 168. 1906. *S. Weberbaueri* Harms, Repert. Sp. Nov. 18: 235. 1922.

Young branchlets rusty-pubescent; stipules rigid with setaceous divisions, caducous; leaflets 4–8 pairs, oblong-lanceolate, obliquely rounded and inequilateral at base, typically rather long-acuminate, 7–10 cm. long, (2) 3–3.5 cm. broad, glabrate or sparsely hirtellous both sides, but lustrous above, firm-chartaceous not at all rugose; panicles ashy-tomentulose, the trichomes minute, the flowers sessile on panicled spikes; calyx slightly yellowish-sericeous, 2.5 mm. long, the longer filiform petals glabrous or with a few cilia at base, the filaments nearly twice as long and abundantly golden-hirsute below; pods 6 cm. long, 2 cm. broad.—Attains 15 meters or 20, and, fide Williams, used as *S. paniculatum*. The Peruvian material has somewhat narrower leaves; *S. Uleanum* is a little more pubescent, the trichomes short; in *S. Weberbaueri* the deciduous bracts exceed the calyces as in *Klug 3291* referred by Harms himself to *S. Uleanum*. *S. guianense* Benth., l.c. 237, seems to be the same except the pubescence is longer as in *S. Radlkoferi* Rusby, Mem. Torrey Club 6: 26. 1896. It seems probable that one variable species is concerned which can be broken up into several "small" species or varieties. Ducke has described *S. macropetalum*, Archiv. Inst. Biol. Veg. Rio Jan. 2: 41. 1935, with the key characters of the above species but in many respects suggesting *S. hypoleucum* but the pedicels 3–6 mm. long, petals to 4 mm. long, obovate-oblong. F.M. Negs. 1810; 1803.

San Martín: Tarapoto, *Ule 6450* (type, *S. Uleanum*). Near Moyobamba, *Klug 3291* (det. Harms, *S. Uleanum*); *Weberbauer 4529* (type, *S. Weberbaueri*). Lamas, *Williams 6467* (det. Harms, *S. Uleanum*). Bolivia to the Guianas.

22. CAMPSIANDRA Benth.

Unarmed trees, the imparipinnate leaves with often thick rather large leaflets, the flowers yellow or rose and borne in short racemes corymbosely panicled. Stipules, bracts and bractlets if present small and caducous. Calyx campanulate, with disk, its lobes as the oblongish petals imbricate. Stamens 15–60, free. Ovary shortly stiped or sessile, free in the calyx-tube, the style filiform or short. Pod large, flattened, straight or curved, plano-compressed, coriaceous, bivalved, the big seeds exarillate with fragile testa, without albumin, the radicle short.

Campsiandra angustifolia Spruce ex Benth. in Mart. Fl. Bras. 15, pt. 2: 55. 1870.

Branchlets and young leaves minutely tomentulose, the many-flowered inflorescence rusty tomentose, the flowers roseate, 7 mm.

long; petiole grooved and angled above; leaflets 9–13, subsessile, usually oblong, acuminate, scarcely coriaceous, slenderly veined both sides, the veins subparallel, 7.5–20 cm. long; pedicels 6–12 mm. long; calyx scarcely more than 4 mm. long, its segments slightly shorter than the disk; anthers hirtellous; ovary short, subsessile, the style short, pod reddish tomentose, 2 dm. long, 5 cm. broad, the large seeds with thin margin.—Bentham questioned if the pod described belonged to the flowering specimen and probably it does not, since the Killip and Smith specimen has glabrous pods 1–1.5 dm. long, to 6 cm. wide, venose, flat, thin, apiculate. To 15 meters; flowers wine red and white (Klug).

Loreto: Mishuyacu, *Klug 1196* (det. Harms); *Killip & Smith 29977* (det. Killip). Brazil.

Campsiandra laurifolia Benth. in Hook. Journ. Bot. 2: 94. 1840; 54. *C. rosea* Poepp. & Endl. Nov. Gen. & Sp. 3: 62. *pl. 268.* 1845.

Apparently rather like *C. angustifolia;* leaflets 11–13 rarely 9, oblong or oblong-elliptic, 2.5–5 cm. wide, finally coriaceous, lustrous and glabrate above, the veins scarcely conspicuous, opaque beneath and there the primary veins elevated, reticulate-veiny; pedicels 12–18 mm. long, articulate beneath the calyx, this 5 mm. long, the obtuse lobes barely 2 mm. long; petals roseate without, white within, broadly oblong, 10 mm. long or shorter; anthers often hirtellous; ovary glabrous, stiped; pod (young) narrowly margined at its dorsal suture, becoming 5 dm. long, 1 dm. broad or larger, coriaceous, lustrous, the compressed orbiculate seeds margined.—*C. comosa* Benth., l.c. 93, has 9-foliate leaves, calyx lobes 3–4 mm. long, petals 12 mm. long, 5 mm. wide. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 15.*

Loreto: Mishuyacu, *Klug 1375* (det. Harms). La Victoria, *Williams 2871.* Caballo-Cocha, *Williams 345.* Río Nanay, *Williams 1142.* Río Mazán, *José Schunke 92.* Brazil. "Haucapu-rana."

23. RECORDOXYLON Ducke

Large trees, glabrous except for the ample terminal panicles of showy golden flowers, these with densely reddish-sericeous calyces. Calyx-tube campanulate, the 5 segments imbricate. Petals 5, narrowly to broadly obovate. Stamens 10, free, glabrous. Ovary sericeous, the style short, thick, incurved with terminal ciliolate

stigma. Pods rather small, oblong, with thin coriaceous fragile valves, tardily dehiscent, the seeds subcarinately margined, exalbuminous, not separated by tissue.—The genus justly honors the senior author of "Timbers of the New World," Record and Hess, 1943.

Recordoxylon stenopetalum Ducke, Archiv. Inst. Biol. Veg. Rio Jan. 4: 16. 1938.

Leaf-rachis narrowly grooved above, usually with 9–11 lanceolate long-acuminate coriaceous leaflets, the larger to 8.5 cm. long, 2.5 cm. broad, subconcolor, finely pinnately nerved and reticulate both sides; buds elongate, obovoid, the pedicels 1 cm. long or longer; calyx-tube at anthesis 9–11 mm. long, turbinate, the segments about 10 mm. long, oblong; petals to 2.5 cm. long, only 7–9 mm. broad, long-cuneately narrowed to the clawed base.—Similar to *R. amazonicum* Ducke, Trop. Woods 39: 17. 1934, the leaflets mostly 7, the larger 8–11 cm. long, 4–5 cm. broad, obtuse or rarely subacuminate, the petals 11–18 mm. broad, shortly clawed, the pods (those of *R. stenopetalum* unknown) shortly stiped, 10 cm. long, 1.5 cm. broad, glabrous. Inner wood very hard. Type from São Paulo Olivença, Brazil, and therefore to be expected in adjacent Peru.

Peru (probably). Brazil.

24. POEPPIGIA Presl.

Large tree, the abundant imparipinnate leaves with a great many small leaflets, the rather inconspicuous yellow flowers in pyramidately paniculate cymes at the end of the slender curved or laxly borne branchlets. Bracts and bractlets caducous, membranous. Calyx segments 5, subequal, more or less connate above the cup-like tube, or sometimes entirely distinct. Petals subequal, oblong, imbricate. Stamens 10, free, glabrous, the anthers versatile. Stipe of ovary obliquely inserted in calyx tube, the style short. Pod flat, membranous, narrowly winged on the upper suture, the 1–2 ovate seeds without albumin, the cotyledon foliaceous, the radicle erect.—Aberrant in the connate calyx-lobes.

Poeppigia procera Presl, Symb. Bot. 1: 16. *pl. 8.* 1832; 53.

Younger parts including the cymes puberulent, leaflets as many as 60, crowded, subsessile, oblong, obtuse or slightly retuse, membranous, mostly about 14 mm. long, 4–5 mm. wide, glabrous at least in age, paler beneath; cymes dichotomous, often only about half as long as the leaves or 4–5 cm. long; pedicels 1.5–2 mm. long;

calyx oblique, 4 mm. long, usually glabrate without but silky-pilose within; petals clawed, oblong, 9–11 mm. long, glabrous, about equaled by the stamens; ovary glabrous or with the stipe villous, the latter in fruit exserted, the pod elongate, 5–10 cm. long, 12–15 mm. wide, barely acute both ends, the wing narrow.—Attains 25 meters. Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 14*.

San Martín: Tarapoto, *Williams 5817* (det. Harms).—Loreto: Middle Ucayali, *Tessmann 3420*.—Río Acre: Mouth Río Macauhán, *Krukoff 5708*. Brazil to Central America and the West Indies. "Cedro-pashaco."

25. BATESIA Spruce

A fine tree, sometimes attaining 30 meters with ample imparipinnate leaves, the leaflets coriaceous, and medium size yellow flowers borne racemosely in terminal panicles, the bracts and bractlets promptly caducous. Calyx-tube campanulate, the limb with 5 imbricate segments. Petals 5, subequal. Stamens 10, the filaments villous at base, the uniform anthers longitudinally dehiscent. Ovary free, the short stipe obliquely dilated at tip, the stout style with terminal concave ciliate stigma. Pods short, somewhat turgid, subligneous, folliculately dehiscing. Seeds 2–3, transverse, exarillate, albuminous.—Harms wrote on the Peruvian specimen "*Batesia* is a very interesting monotype genus." The facies suggests *Tachigalia* and according to Pierce it simulates *Ormosia* in pods and seeds; its tribal position is therefore questionable.

Genus commemorates Henry Walter Bates, zoologist, who spent eleven years (1848–59) in the Amazon valleys as described in his work "The Naturalist on the River Amazons."

Batesia floribunda Spruce ex Benth. Trans. Linn. Soc. 25: 303. *pl. 37*. 1865; 56.

Branchlet tips, panicles and petioles fulvescent with a fine close tomentum, this more or less present as a minute puberulence on the under surfaces of the oblong-elliptic leaflets; petioles often 3 dm. long, deeply grooved above with 9–13 pairs of petiolate leaflets, at least the upper stout petiolules separated by a verruciform gland on the sulcate rachis; leaflets coriaceous, glabrous and lustrous above, reticulate-veined both sides, mostly 10–14 cm. long, about half as wide; panicles much branched, the bracts and bractlets deciduous before anthesis, the pedicels 4–6 mm. long; calyx-tube short-villous within, the segments glabrous within, 4 mm. long;

petals light yellow, about 6 mm. long, narrowly obovate, a little puberulent toward the base; pods shortly stiped, 2.5–3.5 cm. long, nearly 2.5 cm. thick, the lustrous seeds bright red.—Illustrated, Mart. Fl. Bras. 15, pt. 2: *pl. 16*. F.M. Neg. 1530.

Loreto: Mishuyacu, near Iquitos, *Klug 660* (det. Harms). Upper Río Nanay, (*Fernandez 12346–7, 12350–1*, all det. Pierce). Brazil. "Huairuru colorado," "wairuru."

26. BAUHINIA [Plum.] L.

Pauletia Cav.; *Schnella* Raddi.

Reference: Benth. Mart. Fl. Bras. 15, pt. 2: 179–212. 1870.

Trees or shrubs (sometimes armed, sometimes scandent with tendrils) often well marked by the more or less deeply bilobed leaves, the leaves thus in greater or less degree (to completely) bifoliate, less frequently entire, 3–many-nerved, the petiole often aristate between the leaflets (or lobes). Stipules usually small, caducous. Calyx various (sometimes closed in bud), the limb at anthesis cleft, spathaceous or 5-lobed. Petals 5, erect or spreading, little unequal. Perfect stamens 10 or fewer, some reduced to staminodia or wanting; anthers versatile. Ovary stipe, if present, free or adnate, the ovules 2-many. Pods indehiscent or bivalvate, oblong or linear, membranous to rigid, the compressed seeds albuminous, free or separated by tissue or septa, the cotyledons plane, the radicle often exserted.

Apparently it was Plumier who had the idea, appropriately followed by Linnaeus, of naming these plants with usually 2-parted leaves after the brothers Bauhin, Jean and Caspar, Swiss of the early seventeenth century who were as famous in botany as in medicine.

Flower buds more or less elongate, oblong-cylindrical, the limb of calyx in anthesis divided into 5 lobes or these in part united or spathaceous; flowers showy, often more than 3 cm. long, geminate or in open racemes.

Calyx divisions 3 cm. long or longer; leaves often ample.

Angle between leaf lobes acute, narrow.

Leaf lobes one-third to three-fourths as long as the united portion or leaves bilobed; stipules caducous or indurate-conical except *B. forficata*.

Flower buds obtuse or caudate-tipped, not appendaged; petals often linear or oblong-linear.

Leaves minutely puberulent beneath; petals narrowly linear-acuminate.

Flower buds obtuse.....*B. longifolia.*

Flower buds caudate-acuminate.....*B. urocalyx.*

Leaves glabrous; petals obtuse.

Leaf lobes obtuse or acute; stipules flat, pungent. *B. forficata.*

Leaf lobes acuminate; stipules conical, blunt. *B. tarapotensis.*

Flower buds crowned by 5 narrow caducous teeth; petals broad, obtuse.....*B. baina.*

Leaf lobes usually much less than one-fourth of united portion; stipules aculeiform, flattened.

Leaflets shortly villous beneath; flower buds 5-cusped. *B. martinensis.*

Leaflets appressed puberulent beneath; flower buds not appendaged.....*B. acreana.*

Angle between leaf lobes broad, the lobes spreading.

Lobes rounded, the angle shallow; branches armed. *B. aculeata.*

Lobes acuminate, the angle deep; branches unarmed. *B. Straussiana.*

Calyx divisions much shorter than 3 cm.; leaves small.

Leaves villous-puberulent beneath.....*B. Augusti.*

Leaves glabrous or nearly.....*B. Weberbaueri.*

Flower buds short, the limb of calyx at anthesis irregular, 3–5-parted or truncate; flowers usually small or medium, racemose, if about 3 cm. long the calyx longitudinally winged.

Flower buds entire, subsessile.

Stems and leaves glabrous or nearly.....*B. microstachya.*

Stems and leaves beneath reddish pubescent.....*B. Klugii.*

Flower buds crowned by 5 lobes, teeth or setae.

Calyx not longitudinally winged.

Leaves lobed.

Teeth of flower buds setiform.....*B. suaveolens.*

Teeth of flower buds lanceolate or broader.

Leaflets lustrous beneath with a dense, closely appressed red indument.

Bracts not foliaceous.....*B. cupreonitens.*
Bracts foliaceous.....*B. rutilans.*
Leaflets if pubescent not as above.
Leaflets glabrous or the trichomes appressed.
Leaflets deeply lobed; calyx toothed.....*B. Uleana.*
Leaflets barely lobed; calyx lobed.....*B. accrescens.*
Leaflets conspicuously pilose beneath, the trichomes spreading.....*B. porphyrotricha.*
Leaves entire (cf. *B. accrescens*).
Calyx teeth setiform.....*B. Guentheri.*
Calyx teeth oblong.
Bracts not foliaceous.
Leaves ovate-oblong, whitish beneath..*B. Tessmannii.*
Leaves broadly ovate-orbicular, red-lustrous beneath. *B. Kunthiana.*
Bracts foliaceous, persisting.....*B. rutilans.*
Calyx longitudinally winged.....*B. Viorna.*

Bauhinia accrescens Killip & Macbr., spec. nov.

Liana; ramulis novellis subangulatis obscure puberulis; petiolis 2.5–4 cm. longis; foliis integris vel ad apicem breviter lobatis fere orbiculatis ad 13 cm. longis et latis, basi paullo vel vix cordatis, subcoriaceis, junioribus sericeo-pilosis demum obscure sericeo-puberulentis; racemis in paniculam dispositis spiciformibus 4–10 cm. longis subadpresse rufo-pilosis; pedicellis circa 1 mm. longis; alabastris ovoideis, costato-striatis lobis 5 oblongis 4–6 mm. longis coronatis; floribus ignotis.—None of the several species with appendaged flower buds seem to have the leaves or inflorescence of this so we venture to propose it as undescribed even without flowers; it belongs however evidently in section *Tylotea*. The seemingly accrescent calyx lobes were white, according to the collector.

Loreto: Mishuyacu, *Klug 528* (type, U. S. Nat. Mus.).

Bauhinia acreana Harms, Notizbl. Bot. Gart. Berlin 6: 307. 1915.

Shrub or small tree, the branchlet tips and leaves beneath appressed puberulent; stipules indurate-conical; petioles 1–1.5 cm. long; leaves broadly ovate, rounded or lightly emarginate at base, shortly bilobed (the lobes rarely one-fourth as long as the united

portion), obtuse, nearly glabrous above, submembranous, 9–11-nerved, 4–9 cm. long, 2.5–4.5 cm. broad; flower buds narrowly lanceolate, rusty-puberulent, obtuse or acutish, finally with the pedicel 7–9 cm. long; petals 5, lanceolate; ovary long-stiped, pubescent.—The pod according to Ducke is 2–3 dm. long (not including stipe, this about 5 cm. long), 2–2.5 cm. wide, glabrous at maturity, the flowers pure white only at night, the longer stamens with anthers twice the length of the others. Evidently belongs as the author indicates to *B. forficata* and allies which compare. F.M. Neg. 1561.

Río Acre: *Ule 9441*, type. Brazil.

Bauhinia aculeata L. Sp. Pl. 374. 1753.

Shrub, the often stocky flowering branchlets usually conspicuously aculeate by the curved or straight geminate spinescent stipules, these 2–5 mm. long; branchlet tips, petioles and flower buds minutely and scarcely densely brownish-puberulent; petioles 1.5–2.5 cm. long; leaves shallowly bilobed (the lobes broadly rounded), openly cordate at base, usually 6–10 cm. broad, 5–9 cm. long or sometimes suborbicular, membranous, glabrous above, paler beneath and more or less puberulent-pilose or glabrate, 7–9-nerved; flower buds obtuse, finally 5–7 cm. long; calyx spathaceous, 4–5 cm. long; petals broadly obovate, obtuse, 6–7 cm. long, to about 2 cm. broad, long-clawed; ovary shortly hirsutulous; pods long stiped, 10–13 cm. long, 15–18 mm. broad, somewhat verruculose and sparsely puberulent.—*B. grandiflora* Juss. in Poiret, Encycl. Suppl. 1: 600. 1810, based on a Dombey herbarium specimen in Herb. Jussieu, is probably from Ecuador, the specimen actually *Tafalla;* it seems to be the more densely puberulent form represented by *Weberbauer 7716*. Wilkes Expedition got it near Lima, "probably introduced."

Tumbez: Shrub 4 meters high, rainy-green formation, Hacienda La Choza, *Weberbauer 7716*.—Huánuco: *Sawada P46;* shrub or dense tree, flowers white, fragrant, *3539; Ruiz & Pavón; Stork & Horton 9383*. Ecuador. "Uñas de gato."

Bauhinia Augusti Harms, Repert. Sp. Nov. 18: 234. 1922.

Densely leafy shrub, the branchlet tips, leaves beneath and calyces rather closely puberulent-pilose; petioles 5–15 mm. long; leaves suborbicular, cordate at base, the sinus open, 3–5 cm. long, 2.5–5 cm. wide, scarcely medially bilobed, the ovate lobes rounded or sometimes acutish, chartaceous, glabrous above, each lobe with 3–4 nerves prominent beneath as the reticulate venation; pedicels 5–10 mm.

long; flower buds about 3.5 cm. long; petals oblanceolate, 2– nearly 3 cm. long, about 4 mm. broad; filaments sparsely hirsute; ovary stiped.—Two meters high, the flowers white. F.M. Neg. 1567.

Cajamarca: Mouth of Río Chinchipe, Prov. Jaén, 800 meters, *August Weberbauer 6224*, type.

Bauhinia baina Macbr., spec. nov.

Frutex(?) glaber; ramulis teretibus; stipulis plus minusve conico-induratis; petiolis 3–4 cm. longis; foliis late ovatis circa ⅓ acute bilobis 9-nerviis 14 cm. longis, 8–10 cm. latis, basi rotundato-truncatis vel vix cordatis, submembranaceis ubique tenuiter reticulato-venosis; pedicellis circa 4 cm. longis; alabastris apice breviter 5-setis; sepalis oblongo-acuminatis, 5–6 cm. longis; petalis evidente late oblongis, obtusis, circa 10 cm. longis.—The specimen, badly damaged in mounting, does not permit of exact definition of the flower but the relationship of the species seems clearly to be with *B. forficata* Link and allies with broad petals from all of which it is apparently distinct in character of stipules and leaves except *B. tarapotensis* from which the setose-tipped buds and broader petals presumably separate it validly.

Loreto: Río Mazán, *Williams 186*, type. "Baina," "vaina."

Bauhinia cupreonitens Ducke, Archiv. Jard. Bot. Rio Jan. 4: 56. 1925.

Cirrose liana, the stems sinuous and aplanate, the younger branchlets and inflorescences including the flowers without, red-tomentulose; leaves rigid-coriaceous, glabrous and lustrous above, beautifully lustrous red-tomentose beneath, 7 (rarely 9) -nerved, triangularly lobed one-tenth exceptionally to one-fifth, often subentire, usually 5–13 cm. long, about as broad at the cordate base; bracts and bractlets much shorter than the calyx, the flower buds with 5 suborbicular teeth scarcely 1.5 mm. broad.—Calyx lobes white as in the similar *B. rubiginosa* Bong. but with lobed leaves; the related *B. rutilans* usually has entire leaves but ovate foliaceous bracts. F.M. Neg. 16923.

Loreto: Iquitos, *Ducke 20326*. Brazil.

Bauhinia forficata Link, Enum. Hort. Berol. 1: 404. 1821.

Becoming a tree often 10 meters high with pendulous or glabrous branchlets, these usually aculeate with flat spines, leaves usually divided below the middle, glabrous or puberulent, membranous, typically 9-nerved, rounded or scarcely emarginate at base, usually

7–10 cm. long, the slightly divergent ovate lobes obtuse or acute; flowers apparently variable in size, the cylindrical calyx-tube typically 12–25 mm. long, the divisions to 5 cm. long, coherent in a spathe, the petals about as long, broadly linear or oblong, obtusish; anthers all linear; pods 1.5–2.5 dm. long, about 2 cm. broad, the stipe to 5 cm. long.—The following collections, referred here at Dahlem Herbarium (not studied), are probably *B. tarapotensis.*

Loreto: Caballo-Cocha, (*Raimondi*).—Amazonas: Chachapoyas, (*Raimondi*).—San Martín: Moyobamba, (*Raimondi*). To Rio Janeiro.

Bauhinia Guentheri Harms, Notizbl. Bot. Gart. Berlin 9: 969. 1926.

A stout-stemmed liana, the younger branchlets and leaves beneath more or less rusty-puberulent; petioles 1.5–4 cm. long; leaves to about 10 cm. long, 7 cm. wide, entire, ovate, broadly rounded and lightly emarginate at base, sharply acuminate, subcoriaceous, glabrous and somewhat lustrous above, conspicuously reticulate-veined beneath, the nerves 7; racemes short-panicled, rusty-puberulent, the pedicels 4–6 mm. long, the bracts broadly lanceolate, acute, villous, about 4 mm. long, the slightly remote bractlets nearly as long; calyx rusty-villous, the tube 5 mm. long, the short setiform teeth 1–2 mm. long; petals white, narrow, 12 mm. long, yellow-brown villous without.—Type specimen from liana 8 cm. in diameter, 12 meters high. F.M. Neg. 1584.

Loreto: Mouth of Río Santiago, *Guenther Tessmann 4375*, type.

Bauhinia Klugii Standl. Field Mus. Bot. 22: 143. 1940.

Cirrose liana, apparently unarmed, the branchlets, petioles and panicles densely reddish villous-tomentose, the longer trichomes spreading; petioles 1–1.5 cm. long; leaves parted one-third their length (the lobes broadly ovate, obtuse or shortly acute), truncate or emarginate at base where 5–8 cm. broad, slightly lustrous above, finely reticulate-veined, glabrate, paler beneath and subappressed pilose, especially on the 11 prominent nerves; racemes terminal, fascicled or panicled; peduncles to 7 cm. long, the panicles sometimes 12 cm. long; pedicels to 5 mm. long, the linear bracts as long; calyx 7–8 mm. long, the rusty-pilose bud subrostrate, the subequal lobes triangular ovate, about as long as the tube; petals glabrous, nearly twice as long as the calyx; fertile stamens 10; ovary densely villous.—Liana, the buds golden-yellow, in mountain forest.

San Martín: Chazuta, 260 meters, *Klug 4027*, type.

Bauhinia Kunthiana Vog. Linnaea 13: 312. 1839. *B. rosea* Miq. Linnaea 18: 598. 1844.

Cirrose liana, the dark-colored slender branchlets and long petioles as the rachis of the very elongating racemes (except at tip) glabrous or sparsely appressed-pilose; stipules falcate-ovate, deciduous; leaves entire or minutely bilobed, nearly orbicular, usually about 8 cm. broad and long, abruptly acuminate or obtuse, openly cordate at base, coriaceous, glabrous and lustrous above, appressed lustrous tomentose (the trichomes more or less reddish) beneath; pedicels and flower buds reddish, appressed-pilose, about 6 mm. long, the latter ovoid, narrowed at the 5-dentate tip; bracts and bractlets usually narrow, 4–8 mm. long; petals obovate, long-clawed, glabrous except at base, 2 cm. long; ovary villous.—High climbing, the bracts whitish, the petals bright rose color (Ducke). F.M. Neg. 1590.

Huánuco: Without locality, (*Ruiz & Pavón; Raimondi*, det. Dahlem). Amazonian Brazil; Guianas.

Bauhinia longifolia (Bong.) Steud. Nomencl. ed. 2. 1: 191. 1840. *Pauletia longifolia* Bong. Mém. Acad. Petrop. sér. 6. 4: 14. *pl. 7* (leaf). 1836; 192.

Branchlet tips and flower buds minutely and sordidly rusty-puberulent, stipules small, somewhat indurate; petioles 2.5–3 cm. long; leaves ample, one-third to one-half bilobed (ovate lobes more or less acuminate), broadly ovate or even suborbicular, truncate or lightly cordate at base, membranous, dull and reticulate-veined both sides, 7–11 or exceptionally 13-nerved, under a lens minutely and sparsely puberulent beneath; flowers usually 2 in each axil, the pedicels 8–16 mm. long; bracts scale-like, caducous; flower buds ecostate, obtuse, when very young obscurely denticulate at tip, to 7 cm. long; calyx lobes spathaceous, to 8 cm. long, the narrow acuminate petals to 12 cm. long; ovary tomentulose; pods 1.5–2 dm. long, about 18 mm. broad, long-stiped, finally glabrous.—The Peruvian material seems to be larger-flowered than the type from Minas Geraes, and at least some of the following material could perhaps better be referred to *B. tarapotensis*. Determinations except as noted mostly by Standley.

Junín: Slender tree, branches spreading, La Merced, *5412*. Río Perené, 600 meters, *Killip & Smith 25165*. Puerto Bermudez, *Killip & Smith 26408*.—Loreto: Balsapuerto, tree 6 meters, *Klug 2974*. Mouth of Río Santiago, *Mexia 6158* (det. Standl., *B. tarapotensis*). Río Paranapura, *Klug 3941*. Locality illegible, *Tessmann*

3806 (det. Dahlem, *B. tarapotensis*). Florida, *Klug 2169*.—Río Acre: *Ule 9440* (det. Harms); Río Macauhán, tree 20 meters, *Krukoff 5293*. Brazil. "Fuy-cay-berao" (Huitoto), "machete vaina."

Bauhinia martinensis Macbr., spec. nov.

Ut videtur affinis *B. acreana*, differt ramulis foliisque subtus molliter breviterque villosulis; alabastris apice 5-cuspidatis.—In spite of only these apparent differences from the imperfect specimens at hand it seems preferable to give them a specific name rather than regard them as a variety because the nature of the pubescence is entirely different from the minute appressed puberulence of *B. acreana;* in pubescence *B. martinensis* resembles *B. emarginata* Mill. of Colombia with much smaller flowers. Its shortly lobed leaves apparently separate it from pubescent forms or allies of *B. forficata* Link, of Brazil and Paraguay. A number of species have the younger flower buds variously appendaged at tip, as *B. membranacea* Benth., *B. corniculata* Benth., and *B. bicuspidata* Benth., the first two with glabrous or minutely puberulent leaves, the last with leaves red-pubescent beneath, the leaves of all deeply or obtusely lobed. A pod from the collection by Spruce is obscurely puberulent, narrowed to apex, 2 cm. wide at base, 12 cm. long; it was distributed as *B. grandiflora* Juss. affine, with "rounded obtuse lobes"; cf. *B. aculeata*. The Klug specimen was from a 4-meter tree with white flowers.

San Martín: Juanjuí, *Klug 4228*, type. Near Tarapoto, *Spruce 4481*.

Bauhinia microstachya (Raddi) Macbr. Contr. Gray Herb. n. ser. 59: 22. 1919. *B. Langsdorffiana* Bong. Mém. Acad. Petrop. sér. 6. 4: 109. *pl. 1*. 1836; 204. *Schnella microstachya* Raddi, Quar. Piant. Bras. Nuov. 33. 1820.

Cirrose, the branchlets and long racemes, these spike-like and often 1.5–2 dm. long, more or less evanescently rusty-puberulent, the trichomes appressed; leaves bilobed to the middle or above, the lobes bluntly acute or acuminate, the blade usually suborbicular, 6–10 cm. broad and long, widely cordate at base, finely reticulate-veined and lustrous both sides, 7–9-nerved, inconspicuously and sparsely appressed-pilose beneath; flower buds subglobose or ovoid, scarcely apiculate; bracts minute, caducous; calyx lobes 4–5; petals glabrous or sparsely pilose, about 5 mm. long; ovary sessile, reddish-villous; pods shortly stiped, oblong, membranous, obtuse but mucronate by the strongly excentric style, 5 cm. long, 12–16 mm. broad.—

The species apparently is not included by Ducke in the Amazon region, although *Spruce 1522*, from Manaos, was referred here by Bentham; I have seen no material for comparison.

San Martín: Chazuta, 260 meters, *Klug 4060* (det. Standl.).—Loreto: Florida, *Klug 2067; 2073* (det. Standl.). Balsapuerto, *Klug 3004*. Middle Río Marañón, *Tessmann 4972*. Brazil.

Bauhinia porphyrotricha Harms, Notizbl. Bot. Gart. Berlin 6: 307. 1915. *B. Killipiana* Standl. Field Mus. Bot. 22: 143. 1940.

Scandent or the softly red-pilose branches supported in thickets, often cirrose, petioles 2.5–5.5 cm. long, conspicuously red or purplish-pilose with spreading hairs as also the elongating racemes even to the calyces; stipules persisting, broadly ovate-falcate to 10 mm. long; leaf lobes shortly acuminate to acutish, one-third to nearly one-half the length of the blade, this 5–14 cm. long, 4–10 cm. wide, 9–11 (13) -nerved, deeply cordate at base, subcoriaceous, lustrous, glabrous, reticulate-veined above, paler beneath and more conspicuously veined as well as more or less pilose hirsutulous; bracts oblong-lanceolate, the bractlets at calyx base 7–8 mm. long, the pedicels about as long; calyx campanulate with 5 lanceolate teeth, 4–5 mm. long, the striate tube somewhat longer; petals obovate-oblong, villous, 15 mm. long; ovary densely hirsute-villous; pods oblanceolate, glabrous or nearly, 7 cm. long, 2 cm. wide (immature).—There is, it seems to me, no difference in *Klug 4289* except that the leaves are more softly subappressed pilose beneath, the pubescence not so confined to the veins and nerves as in typical form; it may become var. **Killipiana** (Standl.) Macbr., comb. nov. (*B. Killipiana* Standl. Field Mus. Bot. 22: 143. 1940). Another variant, or perhaps distinct specifically, has broader leaves with pubescence of var. *Killipiana* but calyx appressed sericeous and at present may be called var. **Smithiana** Killip & Macbr., var. nov., ut var. *Killipiana* sed foliis subrotundatis, ovario adpresse sericeo (type, *Killip & Smith 26296*). F.M. Neg. 1605.

San Martín: Juanjuí, *Klug 4289* (type, *B. Killipiana*).—Junín: In river bank brush, flowers salmon pink, La Merced, *5557*. Puerto Bermudez, *Killip & Smith 26599* (var. *Smithiana*). Rio Perené, *Killip & Smith 25137* (var. *Smithiana*). Puerto Yessup, *Killip & Smith 26296* (type, var. *Smithiana*).—Loreto: Near Yurimaguas, petals white, faintly pink-striped, *Killip & Smith 27601*. Fortaleza, flowers cream, *Klug 2800*. Middle Aguaytia (probably Ucayali), *Tessmann 3168*.—Puno: *Soukup 1140*.—Río Acre: Seringal San Francisco, *Ule 9439*, type.

Bauhinia rutilans Spruce ex Benth. in Mart. Fl. Bras. 15, pt. 2: 206. 1870.

Cirrose liana, well marked by the beautiful sheen of the dense minute red or copper-colored tomentum that covers the young branchlets, inflorescence and particularly the leaves beneath, these entire, ovate-acuminate, coriaceous, glabrous and lustrous above, 5–7-nerved, commonly 7–12 cm. long, nearly as broad at the rounded base; petioles to 2.5 cm. long; racemes terminal, 5–12 cm. long, simple or paniculately branched, the pedicels rarely longer than 2 mm., the bracts foliaceous, petiolate, ovate, often shorter than the calyx, this costate-striate, about 6 mm. long, with persisting spreading suborbiculate lobes 3 mm. broad and with obliquely orbiculate bractlets at base; petals violet, twice as long as the calyx, puberulent without, the unequal stamens scarcely exserted.—Illustrated, Mart. Fl. Bras. l.c. *pl. 53*. F.M. Neg. 21798.

Loreto: Mishuyacu, *Klug 626; 652; 264* (all det. Killip). Brazil.

Bauhinia Straussiana Harms, Notizbl. Bot. Gart. Berlin 6: 308. 1915.

Branchlets densely brown-velvety as also the petioles (these 1–2 cm. long), the rachis of the short racemes and the linear-lanceolate elongate acutish flower buds, these 5.5 cm. long or longer; leaf lobes widely divaricate, ovate-lanceolate, acutely acuminate, extending more than two-thirds the length of the leaf blade, this 14–21 cm. long, 8–16 cm. broad at the slightly cordate base, somewhat lustrous and glabrous above, shortly but not densely hirsute-villous beneath, 7–9-nerved, rather coarsely reticulate-veined; racemes terminal, many-flowered; ovary densely villous, long-stiped, the stipe glabrous or nearly.—Shrub to 15 meters high, allied by the author to *B. grandifolia* Steud., Amazonian, but that species more pubescent with acute flower buds; the species is named for H. Strauss, long head-gardener of Dahlem. F.M. Neg. 1617.

Río Acre: Cobija, *Ule 9442*, type.

Bauhinia suaveolens HBK. Nov. Gen. & Sp. 6: 320. 1824. *B. longipetala* (Benth.) Walp. Repert. Bot. 1: 852. 1842; 210. *Schnella longipetala* Benth. in Hook. Journ. Bot. 2: 98. 1840.

Sparsely cirrose liana, typically merely puberulent on the leaves beneath, and on the racemes, apparently sometimes these parts densely pubescent; petioles 2–5 cm. long; leaves subrotund, broadly cordate at base, reticulate-veined both sides, 9–11-nerved, lustrous

above, paler beneath, membranous, 4 cm. long and broad to more than twice as large, bilobed to the middle or nearly biparted, lobes rounded or barely acutish; racemes terminal and axillary, solitary, peduncled, the striately angled rachis and calyces appressed sericeous-puberulent; pedicels 10–12 mm. long; bracts linear, 4–6 mm. long, the caducous bractlets as long; flower buds nerved, narrowed both ends, crowned with 5 setiform teeth 2–3 mm. long; petals white, oblong, obtuse, pilose without, about 2 cm. long; stamens 10, all fertile, the filaments glabrous; ovary hirsute.—This includes, at least as to Peru, *B. heterophylla* HBK. l.c. 319, the leaflets more usually ovate-oblong, the lobes often more pointed, and *B. cumanensis* HBK. l.c. 321, similar except for the often dull leaves with sometimes fewer (7–9) leaf nerves and considerably smaller flowers (petals about 12 mm. long); also according to Ducke it is generally trailing in wet fertile clays and has been found on the Río Abunan, ranging north to Colombia and Venezuela; it may nevertheless be expected within the eastern boundaries of Peru. *B. longipetala* is apparently the same as *B. suaveolens;* Ducke has recorded the former as a low vine, characteristic of river margins liable to inundation. I have not seen the type of *B. longipetala* from British Guiana but it seems desirable to note the very pubescent form of the species as it occurs in Peru as *B. suaveolens*, var. **loretana** Macbr., var. nov., foliis subtus conspicue subadpresse pubescentibus. F.M. Neg. 1619.

Cajamarca: Near Cavico, on the Río Guamcabamba, *Bonpland*, type. Bellavista, (*Raimondi*, det. Dahlem, *B. heterophylla*), below Chirinos, flowers roseate, (*Raimondi*, det. Dahlem, *B. heterophylla*). —San Martín: Juanjuí, flowers white and violet, *Klug 3893; 41911.* —Amazonas: Chachapoyas, (*Raimondi*, det. Dahlem, *B. heterophylla*).—Loreto: Lower Morona, middle Marañón, *Tessmann 4919*, var. (det. Dahlem, *B. longipetala*). Mishuyacu, *Klug 485; 1068*, var.; *1010; 595.* Río Mazán, *José Schunke 366* (type of var., det. Standl., *B. Uleana*). Yurimaguas, *Killip & Smith 28310*, var. "Niormo," "pasionaria."

Bauhinia tarapotensis Benth. in Mart. Fl. Bras. 15, pt. 2: 198. 1870.

Tree, glabrous except the densely puberulent inflorescence; stipules ovate-conical, subpersisting, not aculeate; leaves ample, similar to *B. longifolia* but glabrous, mostly 11-nerved and divided one-third or to the middle, the lobes typically acuminate; flower buds obtuse; calyx lobes to 10 cm. long, more or less spathaceous; petals narrow, obtuse, about as long; pods to 2 dm. long, 2.5 cm.

broad or broader.—Bibliographers have overlooked the place of publication of this species. F.M. Negs. 1620; 27957.

San Martín: Tarapoto, *Spruce 4417*, type. Juanjuí, tree to 15 meters, flowers white and rose, *Klug 4234; 3851* (both det. Standl., *B. longifolia*).—Loreto: Yurimaguas, *Poeppig 2101* (probably). Mouth of Santiago, *Tessman 4627* (det. Harms). Ecuador; Colombia(?).

Bauhinia Tessmannii Harms, Notizbl. Bot. Gart. Berlin 9: 261. 1925.

A liana allied to *B. Kunthiana* but the leaves oblong-elliptic, pale beneath with a very fine close indument, pubescent bracts nearly 1 cm. long, and oblong calyx teeth 3 mm. long; older bark exfoliating; leaves chartaceous, 5–7 nerves prominent beneath, 7–12 cm. long, 3.5–6 cm. broad; panicles axillary and terminal, densely flowered, brown pubescent; pedicels 4–8 mm. long; petals white, shortly villous without, 13–15 mm. long.—F.M. Neg. 1622.

Loreto: Cachibo Playa, *Tessmann 3274*, type.

Bauhinia Uleana Harms, Verh. Bot. Ver. Brandenb. 48: 166. 1906.

Scandent, glabrous except for a sparse and minute puberulence on the younger parts including the leaves beneath and the calyces; petioles slender, to 5 cm. long; leaves nearly cordate-orbicular, bilobed at least to the middle (lobes acuminate), lustrous and densely reticulate-veined both sides, usually about 6 cm. long and broad to probably twice as large; racemes on slender peduncles, densely flowered; bracts and bractlets linear-lanceolate; pedicels 4–6 mm. long; calyx-tube striate, the teeth lanceolate; petals 14–15 mm. long, narrowly oblong-lanceolate, more or less sericeous pubescent or villous without; ovary densely hirsute-villous.—The Río Acre specimen has thinner leaves, paler beneath, the venation much coarser, the flowers larger. F.M. Neg. 1624.

San Martín: Juan Guerra, near Tarapoto, *Ule 2643*, type.—Río Acre: Near mouth of Río Macauhán, *Krukoff 5422*.

Bauhinia urocalyx Harms, Notizbl. Bot. Gart. Berlin 6: 308. 1915.

Scandent shrub; petioles to 3.5 cm. long; leaves subovate, bilobed nearly to base (lobes more or less acute) where rounded to lightly cordate, chartaceous or subcoriaceous, glabrous and somewhat lustrous above, opaque and minutely puberulent beneath, 7–9-nerved, the

transverse veins little prominent, 1–2 dm. long, 9–14 cm. broad; racemes terminal, many-flowered, 1.5–3 dm. long or longer, the rachis appressed-tomentulose; flower buds shortly pediceled, brown puberulent, the tips extended as a slender point; calyx finally to 7 cm. long; petals narrowly linear, long-clawed; filaments hirsute-villous at base; ovary shortly tomentulose.—To be expected in eastern Peru, several sterile specimens from Río Itaya and Yurimaguas perhaps belonging here. F.M. Neg. 1625.

Río Acre: Río Jurua-Miri, *Ule 5542*, type.

Bauhinia Viorna Standl. in herb.

Speciei *B. pterocalyx* Ducke similis, differt foliis apice fere ad basin partitis, lobis haud falcatis et obtusis.—Material meager and possibly only a variant of Ducke's species, Archiv. Jard. Bot. Rio Jan. 3: 109. 1922, which with *B. alata* Ducke, l.c. 4: 55. 1925, have been the only species known with prominently winged calyces. In *B. alata* the leaves are entire; in *B. pterocalyx* they are bilobed nearly to the middle, the lobes falcate and acuminate. *B. Viorna* is apparently similar except as noted; its leaves are glabrous unless for a fine and sparse pubescence beneath, the largest of the few shown, 7 cm. long, 6 cm. wide; pedicels 15 mm.; calyx finely appressed pubescent, 2 cm. long, the longitudinal wings most pronounced at base; appendages of the buds ovate-lanceolate, about 5 mm. long, persisting in anthesis; petals roseate, 3 cm. long, densely rusty-villous without, these characters all shared, at least in degree, with Ducke's species.

San Martín: Juanjuí, *Klug 4283*, type.

Bauhinia Weberbaueri Harms, Bot. Jahrb. 42: 91. 1908. *B. Ruiziana* Harms, Repert. Sp. Nov. 18: 234. 1922.

Low, stocky, sometimes procumbent shrub; petioles 2–10 mm. long, puberulent; leaves suborbicular or broadly ovate, somewhat cordate at base, at least medially bilobed (lobes obtuse or rounded), 1–4 cm. long, nearly as broad, obscurely puberulent especially at base beneath or glabrate, slightly lustrous, finely reticulate-veined, opaque and glabrous above; flowers solitary, the oblong-oblanceolate petals 3–4 cm. long, to 1.5 cm. broad; pedicels 7–15 mm. long; calyx spathaceous, subacute in bud, about 2 cm. long; ovary glabrous or nearly; pods oblanceolate, acuminate, about 4 cm. long, 1.5 cm. broad.—Flowers fragrant, bright pink. As Harms himself suggested, *B. Ruiziana* had little but a difference in size and habit

to distinguish it which seems of no value now that similar variation is apparent in *B. Ruiziana*. F.M. Negs. 1628; 1609 (*B. Ruiziana*); 29408 (*B. Ruiziana*).

Cajamarca: Below Rambran, 2,000 meters, in rocks, *Weberbauer 4802*, type; 190.—Huánuco: Ambo, *2411; 3164; Ruiz*, type. *Sawada P103*. Near Huánuco, *3503; Raimondi*.

27. LECOINTEA Ducke

Unarmed trees with simple leaves and few-flowered axillary racemes of small yellow flowers. Stipules caducous. Calyx-tube turbinate-campanulate, the limb nearly or quite entire, rarely laterally cleft. Stamens 10 or 9, free; anthers basally affixed, long-dehiscent. Ovary stiped, 4–6-ovuled, the curved or straight style exserted in bud; stigma small, obliquely terminal. Pod indehiscent, thick but compressed, coriaceous, with 1 or 2 exarillate exalbuminous seeds.—With the aspect of *Zollernia* Mart. but with well-developed calyx-tube, in this respect resembling *Exostylis* Schott but the calyx limb cupulate in *Lecointea*, cleft and reflexed or deciduous or 3–4 parted in the related genera. Genus named for the well-known engineer and naturalist, Paul Le Cointe.

Wood "pracuúba" or "paracuúba," very durable, excellent for fine work and for fuel; it is preferred by Amazonian turtle fishermen for the part of the spear to which the iron is attached (Ducke, Archiv. Jard. Bot. Rio Jan. 3: 130. 1922).

Lecointea ovalifolia Macbr., spec. nov.

L. peruviana differt foliis ovalis vel interdum subrotundatis, 5 cm. longis, 3–4.5 cm. latis, bracteis minutis, caduceis.—In spite of the fact that no other differences are apparent in this flowering material it seems preferable to propose this tree as distinct specifically rather than treat it as a variant; of course it may prove to be only a variety, especially since the locality is the same.

San Martín: Juanjuí, in flower in October, *Klug 3853*, type.

Lecointea peruviana Standl., in herb.

Arbor glabra 8 m. alta; petiolis 3 mm. longis; foliis integris oblongo-ellipticis basi oblique acutis vel plus minusve obtusis, apice breviter obtuseque acuminatis utrinque paullo nitidulis et tenuiter reticulato-venulosis circa 11 cm. longis, 5 cm. latis; racemis solitaribus 2 cm. longis; bracteis striatis 2.5 mm. longis, subpersistentibus;

pedicellis circa 3 mm. longis, haud reflexis; calycibus 3 mm. longis; petalis ochroleuceis subaequalibus circa 4 mm. longis; ovario glabro. —Distributed as a species of *Zollernia;* the original and only species of *Lecointea* heretofore known, *L. amazonica* Ducke, Archiv. Jard. Bot. Rio Jan. 3: 129. 1922 with illustration, 128, has larger leaves, pubescent racemes and ovary.

San Martín: Juanjuí, in flower in April, *Klug 4284*, type.

28. SWARTZIA Schreb.

Reference: Benth. in Mart. Fl. Bras. 15, pt. 2: 14–40. 1870.

Smooth trees or large shrubs with oddly pinnate or 1-foliate leaves, and rather conspicuous flowers in racemes, these often short and fascicled at the older nodes, sometimes panicled, rarely solitary. Stipules caducous. Bracts and bractlets caducous or the latter infrequently persisting. Calyx-tube disk-like or obsolete, the limb before anthesis entire and obovoid or globose, afterwards variously ruptured or rarely cyathiform and erose-dentate. Flowers with one crinkled petal (the standard) or two reduced lateral petals, rarely with none. Stamens many, free or nearly, declinate and incurved-ascending, the anthers uniform (or some filaments longer), basally affixed. Ovary stiped, many-ovuled. Pods ovoid or elongate, turgid or subterete, coriaceous or fleshy, bivalved or indehiscent with reniform ovoid or globose rarely albuminous arillate seeds.

Leaves unifoliate, ample, several cm. wide.

Anthers of larger stamens linear; leaves oblongish, acuminate. *S. pendula.*

Anthers of larger stamens oblong; leaves elliptic, acute. *S. calophylla.*

Leaves with 2–many pairs of leaflets or if rarely unifoliate the leaflets small.

Calyx at anthesis cyathiform; flowers in short, dense even subcapitate racemes.

Leaflets about 1 cm. wide; calyx 5 mm. high . . . *S. Weberbaueri.*

Leaflets usually wider; calyx 3 mm. high . . . . . *S. Matthewsii.*

Calyx at anthesis parted; flowers few or many but loosely borne.

Leaflets 3, rarely solitary, small and unequal.

Stamens 20 or fewer, subequal . . . . . *S. arborescens.*

Stamens unequal, 10–20 larger and many smaller . *S. myrtifolia.*

Leaflets 5–many pairs, ample and little if at all unequal.

Leaflets 3 cm. wide or narrower or the flowers small; ovary densely pubescent.

Flowers about 1 cm. long on pedicels as long. *S. cardiosperma.*

Flowers much smaller on short pedicels. . . . . *S. Tessmannii.*

Leaflets all or mostly 4 cm. wide or wider; ovary glabrous except *S. amplifolia.*

Petal to 4 cm. long; young leaves pilose beneath. *S. macrosema.*

Petal much smaller.

Leaves ample, the leaflets 1.5 dm. long or longer; pedicels soon about 1 cm. long. . . . . *S. amplifolia.*

Leaves medium, the leaflets rarely 1.5 dm. long, the pedicels about 5 mm. long.

Leaflets submembranous, opaque, the nerves remote, obscure. . . . . *S. opacifolia.*

Leaflets subcoriaceous, veiny, nerves approximate. *S. acuminata.*

Swartzia acuminata Willd. ex Vog. in Linnaea 11: 173. 1837; 36.

Large tree, glabrous except for a minute puberulence on the young racemes and flower buds; leaflets 9–13 (petiolules about 5 mm. long), broadly oblong-elliptic, rounded at base, rather abruptly caudate acuminate, usually 7–10 cm. long, 4–5.5 cm. broad, somewhat lustrous above, the subparallel veins obvious both sides; racemes lateral, many-flowered, often 2 dm. long; bracts minute; pedicels 4–6 mm. long; flower buds globose, 6 mm. thick; petal white, cordate-orbiculate, apparently 2 cm. broad; larger stamens 5, slightly longer than the many smaller ones; ovary glabrous.—To 20 meters high, the bark deeply fissured (Spruce). The fruit has one seed sometimes as large as an egg (Ducke). F.M. Neg. 1820.

Peru: (fide Ducke). Brazil; Colombia. "Pitaica," "muirá-cutaea."

Swartzia amplifolia Harms, Notizbl. Bot. Gart. Berlin 9: 970. 1926.

Tree, glabrous except for the brownish-puberulent elongate many-flowered lateral racemes, the leaves ample, often 4 dm. long or longer and with 4–5 pairs of leaflets that apparently may become 3 dm.

long, 8–10 cm. broad; petiolules stout, 3–5 mm. long; leaflets oblong or oblanceolate, rounded or subacute at base, shortly acuminate, chartaceous or in age subcoriaceous, the primary nerves prominent beneath, impressed above; pedicels 7–12 mm. long; flower buds subglobose, scarcely apiculate; calyx divisions 4–5; petal shortly clawed, broadly obovate, about 2 cm. long, nearly as wide; stamens numerous, apparently all the same size; ovary narrowly lanceolate, tomentulose puberulent.—Bark with few to many small ridges (Williams); type from tree 12 meters high, the petal bright yellow (Tessmann). The author remarks that the extraordinarily large leaves are distinctive; perhaps the species is related to *S. stipulifera* Harms, Verh. Bot. Ver. Brandenb. 48: 168. 1906. F.M. Neg. 1823.

Loreto: Mouth of Santiago, *Tessmann 4597*, type. Yurimaguas, *Klug 2774; Williams 4540; 4965* (first det. Standl., last two det. Harms). Río Cachiyacu, *Klug 3122*. Río Mazán, *José Schunke 122*. "Icoje."

Swartzia arborescens (Aubl.) Pittier, Journ. Wash. Acad. Sci. 2: 157. 1921; 22. *Possira arborescens* Aublet, Pl. Guian. 2: 934. *pl. 355*. 1775. *Rittera triphylla* Swartz, Prodr. 82. 1788. *S. triphylla* (Sw.) Willd. Sp. Pl. 2: 1220. 1799.

Small tree (sometimes attaining 20 meters), with many short, densely leafy, irregularly spreading branchlets, the 1–3 (5) leaflets very unequal in size, the larger 4–10 cm. long, the smaller 1–2 cm. long, all obtusely or retusely acuminate, rounded at base, chartaceous, somewhat lustrous, pale green, rather conspicuously parallel-veined, ordinarily glabrous, but sometimes, at least as interpreted, slightly pilose beneath on the midnerve; rachis margined; stipules setaceous, more or less persisting; racemes laxly 2–4-flowered, the bracts setiform; flower buds ovoid, scarcely 4 mm. thick; petal yellow, orbicular, clawed, about 5 mm. long; stamens 18–20, subequal; ovary glabrous, stiped; pods obliquely ovoid, long-acuminate, 3–4.5 cm. long.—Open flood-free forest (Williams). Typically glabrous, some Peruvian specimens, as *Schunke 253*, have appressed pilose branchlets.

San Martín: Chazuta, *Klug 4123* (det. Standl.).—Loreto: Río Mazán, *José Schunke 253* (det. Standl.). Yurimaguas, *Williams 3873* (det. Harms). Río Itaya, *Williams 3516* (det. Harms). Balsapuerto, *Klug 3003* (det. Killip). Iquitos, *Williams 3768* (leaflets sometimes 5, det. Harms). Brazil to the Guianas and Panama. "Bobinzana amarilla" (Schunke).

Swartzia calophylla Poepp. & Endl. Nov. Gen. & Sp. 3: 61. *pl. 267.* 1845; 18.

Tall shrub becoming a tree about 7 meters high, glabrous even to the short few-flowered usually solitary and axillary racemes; leaves simple, firm-chartaceous, light green, finely reticulate-veined on both sides, scarcely lustrous above, oblong or oblong-elliptic, sometimes broadly so, rounded at base, shortly and obtusely acuminate, about 1.5 dm. long, half as broad; racemes 1–4-flowered; pedicels 1–3 cm. long; flower buds ovoid, not apiculate, nearly 1 cm. thick; calyx lobes 2–3 (5); petal shortly clawed, ovate to 4 cm. long, yellow; larger stamens 2–2.5 cm. long, the anthers oblong-elliptic, the much shorter smaller stamens numerous, style about as large as the narrow ovary; pods orange-red, spindle shaped to 7 cm. long, about 15 mm. thick at the middle, the seeds lustrous, grayish-green, 8 mm. long, 6 mm. thick, irregularly trapezoid, half surrounded by a foliaceous aril.—*Spruce 4923*, in fruit, was referred by Bentham, 18, to *S. simplex* (Vahl.) Spreng. (*S. grandiflora* Willd.), Central American species with subcoriaceous calyx, the segments 4–5, and larger petal; the species of the group, however, appear to be indistinctly or are incorrectly, defined. Williams noted the aril as edible; his collections were from open dry places in flood-free forest, bark dark purple, ridged, very thin. F.M. Neg. 1829.

San Martín: Tarapoto and vicinity, *Klug 3790; 4302* (det. Standl.). Pongo de Cainarachi, *Klug 2715* (det. Standl.).—Loreto: Yurimaguas, *Williams 4017; 5295* (det. Harms); *Killip & Smith 27830; Poeppig 2363*, type.

Swartzia cardiosperma Spruce ex Benth. in Mart. Fl. Bras. 15, pt. 2: 33. 1870.

Branchlets at tips and long racemes, these solitary or fascicled on the older defoliate branches, minutely rusty-puberulent; leaflets 5–9, ordinarily 7, shortly petiolulate, oblong, rounded at base, acute or shortly acuminate, firm, chartaceous, glabrous or obscurely puberulent beneath, not at all lustrous, about 7 cm. long, 2 cm. wide, the lower progressively smaller, the terminal one somewhat larger, minutely reticulate-veined, especially beneath; pedicels 12–25 mm. long; flower buds globose, about 6 mm. thick; larger stamens 3–4, their anthers linear, three times longer than the numerous smaller ones, all the filaments pilose; pods reddish-tomentose, subterete, with thick sutures, often constricted between the seeds, attenuate at both ends, 1.5–2 dm. long or sometimes short, the 6–9 seeds

ovoid-globose with foliaceous aril.—*Klug 853* has leaves thinner, obscurely reticulate-veined, its petal suborbicular, shortly clawed, 12 mm. long, 16 mm. broad, yellow; the petal of the type is apparently unknown. *S. discolor* Poepp. & Endl., Nov. Gen. & Sp. 3: 62. 1845, is probably the earlier name, the only apparent difference being that the leaves are somewhat lustrous above, the veins less conspicuous and the larger anthers 2. F.M. Neg. 1830.

Loreto: Mishuyacu, *Klug 853* (det. Harms as "affine"). Brazil.

Swartzia macrosema Harms, Notizbl. Bot. Gart. Berlin 9: 970. 1926.

Tall tree, the young branchlets, leaves beneath and long laxly-flowered racemes rather loosely brown-villous; stipules lanceolate, 1 cm. long or longer; leaflets 4–5 pairs, shortly petiolulate, oblong-lanceolate, slightly narrowed to the obtusish base, obscurely acuminate or acute, to 13 cm. long, 4 cm. broad, at maturity no doubt larger; bracts more or less obovate, 5–7 mm. long; pedicels 9–13 mm. long, the bractlets borne below the calyx, about 5 mm. long; flower buds subglobose, minutely mucronulate; calyx divisions 4; petal suborbicular, scarcely clawed, appressed-pilose toward the base, about 6 cm. broad; filaments glabrous, 2–4 of them longer than the many short ones; ovary glabrous or nearly.—Allied by the author to *S. Sprucei* Benth. with smaller petal. Type from a tree 20 meters high, the calyx bright yellowish-green, the petal yellow. F.M. Neg. 1846.

Loreto: Mouth of Santiago, flood-free woods, *Tessmann 4217*, type.

Swartzia Matthewsii Benth. in Hook. Icon. ser. 3. 1: 51. *pl. 1064*. 1870; 40.

Shrub or tree at once recognizable in flower from other species except *S. Weberbaueri* by the entire truncate or obscurely denticulate calyx, this, as the short subcapitate racemes and the leaf rachi, densely fulvous-pubescent; leaflets 4–9, oblong-elliptic, rounded at base, scarcely acute, subcoriaceous, glabrous above, rather densely and shortly pilose beneath, mostly 6 cm. long, about 2 cm. broad; racemes axillary and terminal; flower buds 4 mm. thick, the calyx at anthesis 6 mm. across; petal narrowly obovate, shortly clawed, 15 mm. long, 6 mm. broad; stamens subequal, the anthers scarcely 2 mm. long; pods puberulent-pilose, lunate, 12 mm. broad, 3 cm. long on stipe 1 cm. long.

Cajamarca: Mountains near Jaén, 1,000 meters, *Weberbauer 6204* (det. Harms).—Amazonas: Chachapoyas, (*Matthews*, type). Bolivia.

Swartzia myrtifolia Smith in Rees, Cycl. 34: no. 5. 1819; 22.

Rather similar to *S. arborescens*, but the leaflets firmer, sometimes with the branchlets softly pilose beneath and, especially, the petal exceeding the calyx segments, about 15 mm. long, 2 cm. broad, and the stamens very unequal, 12–18 of them larger, 15–18 mm. long. —*Williams 8007* from Iquitos has some leaflets 7 cm. long, 4 cm. broad, and pods 3 cm. long, 2 cm. thick; Harms remarks "affine *myrtifolia*" or it could be *S. arborescens*. *S. crocea* (Vell.) Benth. is scarcely distinguishable as remarked by Bentham, except that the petal is 4 cm. broad. *Riveria nitens* HBK. Nov. Gen. & Sp. 7: 267. *pl. 659 bis.* 1825, seems to be the same except that it is pubescent; cf. *S. arborescens*. F.M. Neg. 1848 (*R. nitens*).

Tree to 13 meters, the bark light brown, the heavy wood esteemed for rollers for crushing sugar cane (Williams).

Cajamarca: Near Jaén, *Bonpland* (type, *R. nitens*).—Loreto: Puerto Arturo, flood-free forest, *Williams 5313* (det. Harms). Brazil to Colombia and Central America. "Shatona blanca."

Swartzia opacifolia Macbr., spec. nov.

Arbor, ramulis tenuibus, glabris; foliolis 3–4 jugis, oblongis, basi acutis, interdum rotundatis, apice subabrupte caudatis, circa 10 cm. longis, 3.5 cm. latis (interdum 13 cm. longis, 5.5 cm. latis), ut videtur carnoso-coriaceis, ubique glabris et obscurissime venosis, peropacis; racemis lateralibus infra folia ortis paucifloris circa 6 cm. longis, glabris; pedicellis 6 mm. longis; alabastris subglobosis haud apiculatis tenuiter puberulis, circa 4 mm. crassis calycibus irregulariter 4–5-fidis; staminibus numerosis, antheris ut videtur omnibus subaequalibus ovato-oblongis filamentis glabris, petalum breviter unguiculatum fere suborbiculatum, glabrum, circa 10 mm. longum et latum; ovarium glabrum, longe stipitatum, stylo elongato ab ovario plus minusve incurvo vel deflexo.—Apparently allied to *S. aptera* DC. var. *recurva* (Poepp. & Endl.) Ducke, and *S. cuspidata* Spruce, 36, both Brazilian species with lustrous veiny leaves. Harms suggested that the Tessmann collection was "affine" *S. Schomburgkii* Benth., 38, with rather prominent leaf-venation and minute ashy puberulence. In *S. opacifolia* the remote nerves are often barely visible even beneath. Tree 10 meters high (Klug).

Loreto: Mishuyacu, *Klug 2570*, type. Iquitos, *Tessmann 5389*.

Swartzia pendula Spruce ex Benth. in Mart. Fl. Bras. 15, pt. 2: 19. 1870.

Apparently in foliage and flowers much like *S. calophylla* but the stipules at least typically about 12 mm. long, ovate or oblong and persisting; petioles terete or sometimes wing-margined, tipped by 2 subulate stipules; racemes sometimes several-flowered; calyx segments often 4; style shorter than the ovary; pods ellipsoid, acute both ends, aristate by the persisting style base, 3–4 cm. long, about 1 cm. thick, the stipe 1–1.5 cm. long, typically maturing one lustrous gray-green foliose-arillate seed that nearly fills the pod.—Tall shrub or sometimes tree to 10 meters high with pendent branches, the fruit bright orange or yellow turning red (Williams). *Williams 6550* is very doubtful but in fruit; the stipules are subulate, the pods 8–14 cm. long, somewhat constricted between the 2–5 seeds, these (immature) with foliose aril; it was determined by Harms as "affine."

San Martín: Tarapoto, *Williams 6550*(?).—Loreto: Mishuyacu, tree 4 meters, the flowers yellow, *Klug 6* (det. Harms, affine); *873; 615; Killip & Smith 29881.* Caballo-Cocha, *Williams 2175.* Río Nanay, *Williams 694.* Iquitos, *Killip & Smith 27283; 27317.* Pebas, *Williams 1875.* Brazil. "Itayba," "nina-caspi."

Swartzia Tessmannii Harms, Notizbl. Bot. Gart. Berlin 9: 971. 1926.

Shrub-tree with many slender glabrous branchlets and medium-sized leaves, these with commonly 5 glabrous leaflets; petioles 1–2 cm. long, as the rachis glabrous or puberulent; leaflets oblong-lanceolate, rounded to acute at base, more or less acuminate, papyraceous or subchartaceous, the veins about equally prominent both sides, 5–10 cm. long, 2.5–4 cm. wide; racemes mostly borne below the leaves and lateral, many-flowered, 5–10 cm. long; pedicels 2–4 mm. long, puberulent; calyx segments 3–4 mm. long, sparsely pubescent; petal apparently lacking; stamens numerous; ovary obliquely ovoid, ashy-villous as the stipe, the short style divergent. —In Klug specimen in young flower, petal present, about 5 mm. long. F.M. Neg. 1861.

Loreto: Iquitos, flood-free wood, *Tessmann 3631*, type. Mishuyacu, *Klug 601.*

Swartzia Weberbaueri Harms, Repert. Sp. Nov. 18: 235. 1922.

Like *S. Matthewsii* but perhaps consistently distinct by virtue of the smaller leaflets, these 7–12, oblong-lanceolate, 2–5 cm. long,

5–15 mm. broad, minutely appressed pilose above as well as beneath; calyx 7 mm. across; petal 2 cm. long, or longer, the claw 5 mm. long; pods with stipe and style, 4.5 cm. long, 13 mm. broad.—Shrub, 2 meters high with white flowers. F.M. Neg. 1866.

Cajamarca: Between San Marcos and Crisnejas, 2,300 meters, *Weberbauer 7216*, type.

PAPILIONACEAE

Key adapted from Bentham by tribes. See alternate key, page 235; as remarked by Bentham, the tribes merge with each other.

Stamens 10, free or essentially; trees, tall shrubs, or high-climbing lianas. . . . . *Sophoreae.*

Stamens monadelphous or diadelphous or rarely free (*Adesmia* with articulate pods).

Trees, tall shrubs or high-climbing lianas; leaves pinnate, exceptionally only 1–3-foliate; pods exserted, indehiscent, various in texture. . . . . *Dalbergieae.*

Herbs, vines or shrubs, rarely trees or lianas; leaves often 1–3-foliate; pods usually 2-valved or if indehiscent commonly small, 1–few-seeded or inflated, sometimes spiraled or articulate.

Herbs, usually twining or lianas, rarely ligneous and erect (*Phaseoleae*).

Leaves generally pinnately 3-foliate (1–7), the leaflets entire or lobed, usually stipellate. . . . . *Phaseoleae.*

Leaves abruptly pinnate terminating in a tendril or bristle. *Vicieae.*

Lignescent and erect plants or if herbs not twining.

Pods not articulate (sometimes constricted between seeds).

Leaves rarely 1–3-foliate; flowers solitary, racemose or panicled. . . . . *Galegeae.*

Leaves pinnately or digitately 1–3-foliate or digitately divided.

Leaves pinnately, rarely digitately 3-foliate, the veins often excurrent. . . . . *Trifolieae.*

Leaves simple or digitately divided, entire. . . . . *Genisteae.*

Pods articulate (not always clearly; cf. *Arachis*). *Hedysareae.*

Sophoreae

Leaves pinnate (rarely unifoliate); flowers papilionaceous or nearly regular, sometimes only banner present; stamens sometimes barely connate at base; pods indehiscent or bivalved.

Flowers not distinctly papilionaceous; leaves more or less clearly pellucid-punctate or -reticulate.

Petals 5; pods indehiscent; leaves punctate.....1. *Myroxylon.*

Petal 1 (banner); pods dehiscing; leaves obscurely lucid-reticulate.....2. *Amburana.*

Flowers papilionaceous (unless *Uleanthus* under *Diplotropis*); leaflets not pellucid-punctate or -reticulate.

Stigma terminal; pods indehiscent or tardily dehiscent except *Ormosiopsis* and *Dussia* (cf. *Panurea* under *Diplotropis*).

Banner persisting; pods fleshy, coriaceous, dehiscing. 3. *Dussia.*

Banner deciduous with other petals; pods indehiscent or tardily dehiscent except *Ormosiopsis* (dehiscing in *Alexa,* under *Sophora,* and *Uleanthus,* under *Diplotropis*).

Calyx straight, the lobes short, equal; pods moniliform. 4. *Sophora.*

Calyx more or less incurved, the lobes unequal, well-developed; pods finally bivalved.

Seeds compressed; flowers rose or rose-violet. 5. *Diplotropis.*

Seeds globose; flowers yellow or pale lilac.6. *Ormosiopsis.*

Stigma lateral; pods more or less compressed, bivalved.

Upper calyx lobes not or little enlarged.....7. *Ormosia.*

Upper calyx lobes enlarged, enclosing the corolla. 8. *Monopteryx.*

Dalbergieae

Stipels present only sometimes in *Poecilanthe, Geoffroya, Derris;* inflorescence various; stamens, unless vexillar, connate in 1 or 2 groups.

Pods drupaceous or turgid with a solitary pendulous seed.

Calyx with 2 calyx lobes much enlarged and wing-like.

Ovary subsessile; pods flat, bivalved.....9. *Taralea.*

Ovary stiped; pods ovoid, indehiscent.....10. *Coumarouna.*

Calyx teeth if present subequal or not at all enlarged. 11. *Geoffroya.*

Pods not drupaceous, the seeds not pendulous.

Leaflets opposite (unless sometimes in *Derris* with closed staminal tube, the vexillar infrequently completely free).

Stamens connate above the middle or the vexillar rarely entirely free; wings adhering to keel.....12. *Derris.*

Staminal tube cleft above; wings free.....13. *Platymiscium.*

Leaflets mostly alternate.

Stamens in 2 groups but the vexillar and lowest free; pods winged from stipe, the seed apical.....14. *Platypodium.*

Stamens in 1 group (or vexillar free); pods, if winged, not as above.

Anthers versatile (unless partly in *Poecilanthe*), the parallel cells longitudinally dehiscent.

Calyx turbinate or somewhat acute at base, the teeth short, equal; flowers often showy and laxly borne.

Calyx apparently 4-dentate; pods obovoid. 15. *Poecilanthe.*

Calyx 5-dentate.

Calyx incurved in bud.....16. *Pterocarpus.*

Calyx straight.....17. *Vatairea.*

Calyx obtuse at base, somewhat bilabiate; flowers medium, usually crowded.....18. *Machaerium.*

Anthers basifixed, with apical dehiscence or cells divergent at base.....19. *Dalbergia.*

Phaseoleae

Sometimes erect or lignescent (*Collaea, Eriosema, Erythrina, Cajanus,* rarely *Phaseolus, Vigna*); flowers in axillary racemes, fasciculate, geminate or rarely solitary on the rachis; stamens, unless the vexillar, connate, the anthers not uniform only in *Dioclea* (in part), *Mucuna, Glycine.*

Style longitudinally bearded above within or rarely around the stigma; racemes nodose; bracts small or promptly caducous (cf. *Clitoria,* bracts and bractlets persisting).

Stigma small, terminal; pods broad.....20. *Dolichos.*

Stigma more or less lateral; pods often narrow.

Keel obtuse or beak merely incurved.

Pods not septate; stigma lateral or oblique.....21. *Vigna.*

Pods septate; stigma globose on face of apically complanate style.....22. *Pachyrrhizus.*

Keel more or less spiraled.....23. *Phaseolus.*

Style glabrous except sometimes in *Clitoria* and *Centrosema.*

Flowers showy, the banner either much larger or much shorter than the wings, thus not typically papilionaceous.

Banner much longer than the wings.....24. *Erythrina.*

Banner much shorter than the wings.....25. *Mucuna.*

Flowers small or often showy but petals not very unequal, the flower typically papilionaceous.

Flowers nodose-racemose or rarely amply paniculate (in *Dioclea leiantha,* flowers dense).

Vexillar stamen free at base, then (at least at anthesis) connate with others into a closed tube.

Lianas.

Calyx obviously and unequally bilabiate, the upper lip entire to parted, the lower reduced. 26. *Canavalia.*

Calyx 2–4-lobed but not clearly bilabiate.27. *Dioclea.*

Erect shrubs.....30. *Collaea.*

Vexillar stamen entirely free.

Flowers showy; upper calyx lobes 1 and bidentate; *Dioclea*-like plant.....28. *Cymbosema.*

Flowers to 1.5 cm. long, often smaller.

Calyx lobes apparently 4.....29. *Galactia.*

Calyx lobes 5, the upper one biparted or dentate. 31. *Calopogonium.*

Flowers in axillary fascicles or racemes, the rachi not at all nodose (flowers sometimes subumbellate, in narrow panicles, or solitary); cf. *Galactia.*

Scandent or more or less lignescent and erect.

Leaflets resinous-punctate beneath; bracts promptly caducous.

Plants twining (Peruvian); ovules 2–3..32. *Rhynchosia.*

Plants erect (Peruvian).

Ovules 2; pods narrow.....33. *Cajanus.*

Ovules several; pods broad.....34. *Eriosema.*

Leaflets not punctate; bracts persisting except *Glycine.*

Flowers showy or medium; anthers reniform.

Banner ample, explanate.

Calyx-tube campanulate; banner keeled or somewhat gibbous.....35. *Centrosema.*

Calyx-tube cylindrical; banner smooth. 36. *Clitoria.*

Banner complicate, medium.....37. *Cologania.*

Flowers small; anthers (alternate) imperfect. 38. *Glycine.*

Trees; flowers in narrow panicles.....39. *Platycyamus.*

Vicieae

Vines or erect herbs; leaflets entire or denticulate, estipellate; stipules often conspicuous; flowers solitary or in axillary racemes; stamens 9, the vexillar free or more or less connate, rarely lacking, anthers uniform.

Style glabrous.

Calyx truncate, the teeth minute; pods flat.....40. *Abrus.*

Calyx toothed; pods turgid.....41. *Cicer.*

Style bearded apically or laterally.

Beard entirely lateral.....42. *Lathyrus.*

Beard apical.....43. *Vicia.*

Galegeae

Herbs or shrubs, rarely trees or lianas; leaves ordinarily imparipinnate and leaflets many (rarely 1–3), usually entire; stamens usually 9 in a tube cleft above, the tenth more or less free; anthers versatile, uniform, rarely the alternate larger and sub-basifixed; pods not articulate, bivalved or if indehiscent commonly small, 1–2-seeded or inflated.

Glandular-punctate herbs or shrubs, the pods small, indehiscent, usually 1-seeded.

Ovules 1; racemes or spikes terminal or axillary; leaves usually digitately foliate.....44. *Psoralea.*

Ovules 2; spikes terminal or opposite the leaves, these usually imparipinnate.....45. *Dalea.*

Eglandular (except *Indigofera*, 1 species) pods bivalved, in *Astragalus* partly septate or divided, usually several-seeded.

Anther connective glandular or with a bristle; trichomes of leaves medially affixed.....46. *Indigofera.*

Characters not as above, at least completely.

Pods often bivalved; shrubs or erect perennials.

Calyx tubular, conspicuously bracted.....47. *Barbieria.*

Calyx campanulate.

Style glabrous unless at base.

Vexillar stamen free.....50. *Sesbania.*

Vexillar stamen connate or free only at base.

Pods subterete; pedicels filiform.....48. *Galega.*

Pods compressed; pedicels often short.

Flowers in clusters on the racemes..49. *Tephrosia.*

Flowers geminate.....51. *Apurimacia.*

Style bearded; flowers often solitary.....52. *Coursetia.*

Pods often more or less imperfectly divided; cespitose or low shrubs, rarely annual.....53. *Astragalus.*

Hedysareae

Like *Phaseoleae* and *Galegeae* but the pod divided into 1-seeded segments, these rarely reduced to 1.

Stamens all free.....54. *Adesmia.*

Stamens connate in 1 or 2 groups or the vexillar free or partly free.

Leaves glandular-punctate.

Leaflets 3 or 4; calyx teeth short, equal.....55. *Poiretia.*

Leaflets many; calyx lobes unequal.....56. *Weberbauerella.*

Leaves not punctate.

Stamens not uniform, all in a closed tube.

Leaflets 4; stipules present.....57. *Arachis.*

Leaflets 2 or 3; stipules wanting.

Leaflets 3; pod segments 1 or 2.....58. *Stylosanthes.*

Leaflets 2; pod segments usually several.....59. *Zornia.*

Stamens uniform, the vexillar free or the tube cleft.

Vexillar stamen free; herbs or small shrubs or half shrubs; stipules present.....60. *Desmodium.*

Vexillar stamen if free only at base or tardily and plant then scandent; stipules wanting.

Calyx lobes very unequal, the uppermost larger.
61. *Amicia.*

Calyx lobes subequal or calyx bilabiate.

Erect or rarely diffuse; pods stiped; stamens usually all connate, the tube cleft both sides.
62. *Aeschynomene.*

Scandent or sprawling; pods sessile or shortly stiped; vexillar stamen free at base or finally free.

Flowers in few-branched panicles longer than the leaves; pods broadly oblong-lanceolate.
63. *Raimondianthus.*

Flowers racemose, the racemes usually shorter than the leaves; pods narrowly oblong or samaroid.

Pods not samaroid.

Inflorescence shorter than the leaves.
64. *Chaetocalyx.*

Inflorescence much longer than the leaves.
65. *Fiebrigiella.*

Pods with obovoid winged ultimate segment.
66. *Nissolia.*

Trifolieae

Typified by the well-known *Trifolium* and *Medicago.*

Petals often marcescent, the lower or all adnate to stamen tube; leaves usually digitately 3-foliate.....67. *Trifolium.*

Petals free from staminal tube, more or less promptly deciduous; leaves pinnately 3-foliate.

Pods spiraled; inflorescence short.....68. *Medicago.*

Pods subglobose or obovoid.....69. *Melilotus.*

Genisteae

Herbs, shrubs, rarely trees, never scandent; leaves simple or digitately (1) 3–many-foliate; corolla papilionaceous; stamens monadelphous, vexillar rarely free, the alternate longer anthers often basifixed; pods usually bivalved.

Stamen tube cleft above; pods turgid.....70. *Crotalaria.*
Stamen tube closed; pods usually compressed.
Calyx subspathaceous, the teeth minute.....71. *Spartium.*
Calyx teeth well-developed.....72. *Lupinus.*

Alternate key

Stamens free or nearly or in *Adesmia* rarely 2 adnate at base to banner (*Sophoreae* except *Adesmia*).
Flowers not typically papilionaceous.
Petals 5; calyx short; pods indehiscent.....1. *Myroxylon.*
Petal 1; calyx tubular; pods dehiscent.....2. *Amburana.*
Flowers typically papilionaceous (unless *Uleanthus* under *Diplotropis*).
Pods segmented or moniliform; calyx lobes equal or subequal.
Leaflets abruptly pinnate, small.....54. *Adesmia.*
Leaflets imparipinnate, medium.....4. *Sophora.*
Pods not segmented; calyx lobes partly (the upper) connate.
Stigma lateral; calyx straight or nearly.
Calyx not or scarcely bilabiate.....7. *Ormosia.*
Calyx bilabiate, the upper lip including the corolla. 8. *Monopteryx.*
Stigma terminal.
Banner persisting after fall of other petals.....3. *Dussia.*
Banner falling with other petals.
Flowers rose or rose-violet.....5. *Diplotropis.*
Flowers yellow or pale lilac.....6. *Ormosiopsis.*
Stamens at least in part connate.
Trees, tree-like shrubs or lianas, these normally vigorous; leaves with 5–many leaflets or the leaflets rarely 1–3 but estipellate, eglandular; pods never segmented but in *Erythrina* sometimes constricted between the seeds (*Platycyamus* might be sought here). Cf. also *Gliricidia* under *Sesbania, Coursetia* and *Apurimacia, Spartium.* (*Dalbergieae* except *Platypodium, Erythrina.*)
Staminal tube not cleft (vexillar stamen may be free).
Pods more or less constricted between the seeds; banner strikingly larger than the wings; leaves always trifoliate. 24. *Erythrina.*

Pods not constricted between the seeds; banner moderately if at all larger than other petals.

Wings free; pods drupaceous, 1-seeded; calyx teeth developed (Peruvian) except minute in *G. inermis*. 11. *Geoffroya*.

Wings adherent to keel; pods not drupaceous; calyx teeth obsolete or minute. . . . . 12. *Derris*.

Staminal tube cleft or stamens connate into 2 groups, the vexillar often free.

Stamens in 2 groups and 2 free; anthers versatile; pods inverted samaroid; flowers yellow. . . . . 14. *Platypodium*.

Stamens in 1 group (unless vexillar); pods various, but the wing not proceeding as above from stipe.

Leaves and leaflets opposite; flowers often yellow. 13. *Platymiscium*.

Leaves and leaflets alternate or at least one or the other alternate.

Calyx normal; pods not drupaceous.

Anthers basifixed, opening by terminal or oblique chinks, if longitudinally dehiscent the cells diverging. . . . . 19. *Dalbergia*.

Anthers versatile, at least in part, longitudinally dehiscent, the cells parallel.

Calyx obtuse at base, more or less bilabiate; flowers medium, usually crowded. . . . . 18. *Machaerium*.

Calyx more or less acute at base or turbinate, the teeth short, equal; flowers often showy and laxly borne.

Calyx seemingly 4-dentate; anthers in part nearly basifixed. . . . . 15. *Poecilanthe*.

Calyx 5-dentate; anthers uniform, all versatile.

Calyx incurved in bud; flowers often yellow. 16. *Pterocarpus*.

Calyx straight; flowers violet. . . . 17. *Vatairea*.

Calyx with 2 upper lobes much enlarged, these wing-like.

Ovary subsessile; pods flat, bivalved. . . . . 9. *Taralea*.

Ovary stiped; pods ovoid, indehiscent. 10. *Coumarouna*.

Half-shrubs, vines, these more or less woody or herbaceous, or herbs, sometimes shrubs but at least in general the leaflets

stipellate and 3 or few or glandular or the pods segmented (*Raimondianthus*, tardily). Cf. (rarely) *Phaseolus*, *Vicia*, *Vigna*.

Stamens or at least anthers not uniform, in any case unequal.

Stipels wanting.

Flowers racemose; pods not segmented.

Plants never broom-like.

Stamen tube cleft above; pods turgid . . 70. *Crotalaria*.

Stamen tube closed; pods compressed . . . 72. *Lupinus*.

Plants broom-like, leafless or the single leaflet minute. 71. *Spartium*.

Flowers spicate, often capitate, rarely solitary.

Leaflets 3; pod segments 1–2 . . . . . 58. *Stylosanthes*.

Leaflets 2; pod segments usually several . . . . . 59. *Zornia*.

Stipels present.

Leaflets 4; pods maturing under ground . . . . . 57. *Arachis*.

Leaflets 3 (1–5); pods racemose.

Rachis nodose; glabrate or ashy-pubescent vines. 27. *Dioclea*.

Rachis enodose; rusty pilose vine . . . . . 38. *Glycine*.

Stamens uniform.

Leaflets glandular punctate beneath.

Plants twining.

Stamens all connate; bracts caducous . . . 32. *Rhynchosia*.

Vexillar stamen free; bracts persisting . . . . . 55. *Poiretia*.

Plants herbs, sprawling to erect, or shrubs (the Peruvian).

Reddish-brown villous shrubs . . . . . 34. *Eriosema*.

Ashy strigose to glabrate herbs or shrubs.

Pods long.

Leaflets several to many.

Leaflets few; calyx teeth subequal . 46. *Indigofera*.

Leaflets many; calyx teeth very unequal. 56. *Weberbauerella*.

Leaflets 3 . . . . . 33. *Cajanus*.

Pods very short.

Ovules 1; leaves usually imparipinnate . . . 45. *Dalea*.

Ovules 2; leaves usually digitately foliate. 44. *Psoralea*.

Leaflets eglandular beneath.

Herbs or shrubs, sometimes sprawling; flowers never white with big black blotch; stipels wanting, minute or gland-like (*Erythrina*) except *Barbieria, Collaea, Desmodium, Platycyamus. Raimondianthus* may be scandent and *Cicer*, sometimes tendril-bearing, has turgid pods.

Flowers usually 3–several cm. long.

Calyx lobes very unequal; leaflets 2 pairs. . 61. *Amicia.*

Calyx lobes not distinctly unequal.

Leaflets many; calyx colored, bracted. 47. *Barbieria.*

Leaflets trifoliate.

Banner much longer than the wings. 24. *Erythrina.*

Banner not much longer than the wings. 30. *Collaea.*

Flowers small or medium.

Leaves digitately or pinnately 3-foliate; pods not segmented.

Flowers capitate. . . . . 67. *Trifolium.*

Flowers spicate or racemose, the spikes sometimes short.

Pods curved or spiraled. . . . . 68. *Medicago.*

Pods ovoid. . . . . 69. *Melilotus.*

Leaves (Peruvian) several to many foliate or the pods segmented, the leaflets rarely reduced to 1.

Vexillar stamen free.

Pods not segmented; leaflets several.

Leaflets dentate. . . . . 41. *Cicer.*

Leaflets entire.

Anthers not mucronate.

Plants low; pods short, not or scarcely longer than broad. . . . . 53. *Astragalus.*

Plants tall; pods large.

Calyx glabrous or nearly. . 50. *Sesbania.*

Calyx brown tomentose. 39. *Platycyamus.*

Anthers mucronulate.....46. *Indigofera.*

Pods segmented; leaflets usually 3. 60. *Desmodium.*

Vexillar stamen connate or free well below or rarely tardily free (*Chaetocalyx*).

Pods not segmented; flowers not yellow, sometimes yellowish but plants then shrubs (cf. *Raimondianthus*).

Flowers white or blue on filiform pedicels; pods terete.....48. *Galega.*

Flowers neither entirely white or blue, the pedicels usually short; pods compressed.

Flowers in clusters on the racemes.
49. *Tephrosia.*

Flowers solitary or geminate on the racemes.

Style glabrous unless at base; flowers geminate.....51. *Apurimacia.*

Style bearded; flowers often solitary.
52. *Coursetia.*

Pods segmented (sometimes tardily as in *Raimondianthus*); flowers yellow, often brownish or purplish striate; plants herbaceous.

Leaflets few.

Inflorescences shorter than leaves.
64. *Chaetocalyx.*

Inflorescences longer than leaves.
65. *Fiebrigiella.*

Leaflets usually many.

Pods narrow; flowers rarely more than 1 cm. long.....62. *Aeschynomene.*

Pods broad; flowers about 2 cm. long.
63. *Raimondianthus.*

Vines (except one species *Vicia* with black and white flowers) or lianas, sometimes merely clambering (cf. *Raimondianthus, Chaetocalyx*); stipels usually present, often setaceous, sometimes minute or deciduous (exceptions *Abrus, Lathyrus, Nissolia, Vicia*).

Style bearded at least above.

Calyx tubular, conspicuously bracted.

Banner narrow; style bearded from base.
47. *Barbieria.*

Banner broad; style bearded above....36. *Clitoria.*

Calyx short, campanulate.

Leaves trifoliate.

Keel more or less spiraled.....23. *Phaseolus.*

Keel obtuse or beaked, sometimes incurved.

Stigma more or less lateral; pods narrow.

Pods septate.....22. *Pachyrrhizus.*

Pods not septate.....21. *Vigna.*

Stigma terminal; pods broad.....20. *Dolichos.*

Leaves pinnate.

Style beard apical or all around.....43. *Vicia.*

Style beard confined to one side....42. *Lathyrus.*

Style glabrous above or the stigmatic portion sometimes puberulent as in *Centrosema.*

Banner much shorter than wings.....25. *Mucuna.*

Banner large or the petals all subequal or the wings reduced.

Rachis of inflorescence not at all nodose.

Calyx campanulate.

Flowers large, not yellow; pods samaroid. 35. *Centrosema.*

Flowers yellow, small; pods samaroid. 66. *Nissolia.*

Calyx tubular.....37. *Cologania,* 38. *Glycine.*

Rachis nodose (concealed by the flowers in *Dioclea leianthus*).

Calyx obviously bilabiate.....26. *Canavalia.*

Calyx little if at all bilabiate.

Vexillar stamen free only at base..27. *Dioclea.*

Vexillar stamen entirely free or lacking.

Flowers 2–3 at each node, 3 cm. long or longer; pods broad.....28. *Cymbosema.*

Flowers small or medium; pods often narrow.

Calyx toothed or lobed; pods narrow.

Buds acuminate; calyx lobes 4. 29. *Galactia.*

Buds not acuminate; calyx lobes 5.
31. *Calopogonium.*

Calyx truncate, the teeth minute; pods broad.....40. *Abrus.*

1. MYROXYLON L. f.

Reference: Harms, Notizbl. Bot. Gart. Berlin 5: 94. 1908.

Trees with oddly pinnate leaves, the alternate estipulate leaflets pellucid-lineate or punctate, the fragrant white flowers in terminal axillary sometimes somewhat paniculate racemes. Calyx irregularly dentate. Standard broadly orbicular, the 4 lower petals subequal, narrow. Stamens deciduous with the petals, free or nearly; anthers uniform, acuminate. Ovary long-stiped, 1 (–2) -ovuled at apex, the short style with small terminal stigma. Pod compressed, indurate and 1-seeded at tip, the sterile lower part 2-winged, the fruit thus like an inverted samara.

Balsam of Peru, used pharmaceutically and in perfumery, in spite of its name was originally discovered and has since been produced commercially in San Salvador; cf. Harms, l.c. 95, and "El balsamo de la Salvador" by L. A. Hernández, Rev. Agric. Trop., San Salvador, 10–20: 42–47. 1936 and U. S. Dispensatory, 22nd edition. However, the same tree or a slight variation of it is not uncommon in Peru where it may attain 30 meters. Ruiz, Travels of Ruiz, Pavón and Dombey in Peru and Chile (English translation, Field Mus. Bot. 21: 176–177. 1940) gives an excellent description of it and the balsam.

Myroxylon Balsamum (L.) Harms, l.c. 94. *Toluifera Balsamum* L. Sp. Pl. 384. 1753. *M. Toluifera* (L.) HBK. Nov. Gen. & Sp. 6: 375. 1824.

Usually glabrous except racemes; leaflets several–13, ovate or ovate-oblong, acuminate, often obtusely, more or less subcoriaceous, reticulate, veiny, lustrous, ordinarily 6–9 cm. long, 3–4 cm. wide; racemes closely tomentulose, pedicels 1.5 cm. long; calyx 4–6 mm. long; banner 12 mm. long, 8 mm. wide; pod usually about 8 cm. long, 2.5 cm. broad, the style-tip noticeably situated below the curved upper edge, the seed portion with 2 globose balsam pits between the corky mesocarp and coriaceous endocarp, leaving the seeds smooth (that is, not sticky with balsam), the testa if present dry and thin (Harms).—The var. *punctatum* (Klotzsch) Baillon ex Harms, l.c. 97, has, it is said, thicker leaves than the type or var. *Pereirae*, of

Central America and is without the uniform mixture of pellucid lines with dots; it is the "quinoquino" of Ruiz & Pavón from Chicoplaya and Pozuzo. Preuss described the form of Central America as most beautiful, the bark gray, more or less spotted with yellow roughenings, the wood with the hardness of mahogany and cedar. Harms' account is both exhaustive and careful and I acknowledge my indebtedness.

Only the following material that is in fruit is of course definitely this species; cf. note under *M. peruiferum*. F.M. Negs. 1887; 6933.

San Martín: Tarapoto, *Williams 6230* (det. Harms).—Huánuco: Chicoplaya, Pozuzo, *Ruiz & Pavón* (fr.).—Loreto: Santa Rosa, *Williams 4882* (det. Harms). Pebas, *Williams 1805* (det. Harms). Mouth of Santiago, *Tessmann 5470* (fr.); *4489* (det. Harms). Río Paranapura, *Klug 3947* (det. Standl., *M. peruiferum*). Río Mazán, *José Schunke 316* (det. Standl., *M. peruiferum*).—Río Acre: Mouth of Río Macauhán, *Krukoff 5484* (fr.). Brazil to Venezuela and Central America. "Estoraque," "quinoquino."

Myroxylon peruiferum L. f. Suppl. 233, 1781; 92. *Myrospermum pedicellatum* Lam. Encycl. 4: 191. 1797?

Like *M. balsamum* but the style tip of the pods less lateral, that is, only slightly below the upper curve of the pod-tip and, especially, the seed roughened with forking grooves that are balsam-filled, and thus somewhat sticky, the 2 balsam pits lacking.—The balsam of this tree is said to be harder and redder in color than that of *M. balsamum*. Bentham, in Mart. Fl. Bras. 15, pt. 1: 309. 1862, described this species as having thinner smaller leaves with more narrow pellucid lines than round pellucid dots and also ascribed to it somewhat smaller flowers. However as Harms remarks there seems to be no value in these characters but, like him, I have seen comparatively little material. Anyway, for a final understanding of these trees, flowering and fruiting specimens must be available from marked individuals. I am not entirely satisfied that there is not a co-ordination between the fruiting and vegetative characters; otherwise, if the ranges really are the same, the fruiting characters may be found variable or a state; it is noteworthy that in *M. balsamum* seed testa may or may not be obvious. The Ruiz specimen, in view of the history of this collection, may well actually have come from Ecuador. The type, notwithstanding the name, came from Colombia. The fruits of both species are best illustrated in an excellent paper on the trees by Baillon in Assoc. Franç. l'Avanc. Sci. Lyon, *pl. 10*. 1874.

Peru: Without locality, *J. de Jussieu* (type, *M. pedicellatum*); *Ruiz* (fide Harms).—Río Acre: (fide Ducke). Argentina and Bolivia to Colombia and British Guiana.

2. AMBURANA Schwacke & Taub.

Trees with oddly pinnate leaves, many alternate leaflets and white or yellowish flowers with only one petal (the banner) in more or less branched racemes. Calyx campanulate, truncate or minutely toothed. Banner broad, shortly clawed, cordate at base. Stamens 10, one much shorter than the others; anthers dorsifixed. Ovary stipe adnate to calyx-tube. Style short, stigma terminal. Pods compressed, the seed or seeds borne near the base, the pod then turgid and above this part extended as a wing.

The Peruvian species is "a big forest tree, highly esteemed for its excellent timber and for its seeds which are the source of a popular perfume" (Ducke).

Amburana cearensis (Fr. Allem.) A. C. Smith, Trop. Woods 62: 30. 1940. *Torresea cearensis* Fr. Allem. Trab. Com. Sci. Explor. Ceara, Sec. Bot. 17. *pl. 5.* 1864. *Torresia acreana* Ducke, Archiv. Inst. Biol. Veg. Rio Jan. 1: 205. 1935. *A. acreana* (Ducke) A. C. Smith, l.c.

Tree attaining 30 meters or more, the brown bark often separating into slender pieces, and, like the brownish wood, with the odor of coumarin; leaves in type 7–15, in Peruvian variety rarely 15–25 foliate, the ovate-lanceolate or ovate-oblong acutish chartaceous leaflets obscurely puberulent beneath, mostly 6–7 cm. long, 2–3 cm. wide; inflorescence 4 cm. long or longer, rather lax, minutely appressed puberulent or subglabrous including the calyx-tube; banner about 6 mm. long, somewhat broader, pilose without; pods 4.5–7 cm. long, 1.5 cm. wide, rounded at both ends, rather lustrous-brown and glabrous but obscurely reticulate-roughened, strongly flattened except over the usually solitary seed where conspicuously swollen; seed borne about 1 cm. from the base (if 2 seeds the second just above it), about 5 mm. long, broadly winged with a linear hilum across the end.—Description of pods in part after Gleason, Phytologia 1: 136. 1935. As remarked by Smith the Peruvian tree is similar to the type except for the more numerous leaflets; even this character varies somewhat and the inflorescences are only about 4 cm. long in *Klug 4064* as in the type; it may become var. **acreana** (Ducke) Macbr., comb. nov. (*T. acreana* Ducke, l.c.). The original name,

written "*Torresia*" by Gleason and by Ducke, is in conflict with the earlier "*Torresia*" of Ruiz & Pavón. Illustrated, Trab. Com. Sci. Explor. Ceará, Sec. Bot. 17: *pl. 5*.

San Martín: Chazuta, *Klug 4064*.—Río Acre: Seringal Iracema, (*Ducke 23769*, type, var.). Mouth of Río Macauhán, *Krukoff 5495* (as to fruits). Bolivia; Brazil. "Cumarú de cheiro," "imbarana de cheiro," "ishpingo."

3. DUSSIA Krug & Urban

Vexillifera Ducke, Archiv. Jard. Bot. Rio Jan. 3: 140. 1922.

Trees with imparipinnate leaves, stipules and stipels lacking. Inflorescence axillary, racemose or paniculate-racemose, the flowers medium size, the bracts and bractlets prominent. Calyx-tube obliquely campanulate, the receptacle obconic, the limb 5-lobed, the upper two lobes connate. Petals subequal; banner broad, not appendaged. Stamens 10, 9 connate at base; anthers versatile. Ovary (in hermaphrodite flowers) shortly stiped, about 4-ovuled, the style curved, the stigma terminal, minute. Pods ovoid, ligneous, 1–3-seeded.—Nearly *Ormosia* but that with hooked style, the stigma lateral (Harms).

Dussia discolor (Benth.) Amsh. Med. Bot. Rijks Herb. Utrecht 52: 50. 1939. *D. Tessmannii* Harms, Notizbl. Bot. Gart. Berlin 9: 972. 1926. *Vexillifera micranthera* Ducke, l.c.

Tall tree, the younger branchlets, leaf-rachi and inflorescence more or less clothed with a brownish velvety or villous pubescence, this extending to the under surface of the many leaflets but there shorter; petiolules 5–8 mm. long, alternate or nearly; leaflets oblong or lanceolate, rounded or obtuse at base, acute, glabrous above, nerves prominent beneath, 10–12 cm. long, or one-third as broad, or larger; racemes to several dm. long, more or less angled; bracts ovate-lanceolate, to 17 mm. long, 7 mm. wide; pedicels 6–8 mm. long; bractlets to 15 mm. long, 8 mm. wide; lower part of calyx-tube 4–5 mm. long, the limb 4 mm. long, the broadly lanceolate acute teeth 5 and 6–7 (the upper) mm. long; banner 2 cm. long or longer; vexillar stamen sometimes free; ovary stipe glabrous below, the ovary villous, with 4–5 ovules.—The bark when cut emits a red-brown sap; calyx tips whitish-green, banner carmine, wings rose, keel whitish marked with orange (Tessmann).

Description is of the Peruvian form after Harms; when more material accumulates it may be found to be at least varietally distinct

from *D. discolor*. Harms himself who once determined *Weberbauer 1877, V. micranthera*, has remarked that only measurements at present seem to separate specimens from various areas of South America. Illustrated (fls.) Ducke, l.c. F.M. Negs. 1897 (*D. Tessmannii*); 1898 (*Weberbauer 1877*).

Junín: La Merced, *Weberbauer 1877*.—Loreto: Mouth of Santiago, non-inundated woods, *Tessmann 4085* (type, *D. Tessmannii*). Brazil and north to Mexico.

4. SOPHORA L.

Shrubs with imparipinnate leaves, the many leaflets opposite or nearly, and terminal racemes, these often short. Calyx obscurely or shortly toothed. Stamens distinct. Stigma minute, terminal. Pods moniliform, much constricted between the seeds.—*Alexa* Moq. (*A. bauhiniaeflora* Ducke and *A. grandiflora* Ducke, Amazonian, most likely to be found within Peru) is marked by showy flowers, the thick petals densely pubescent without, borne in racemes at defoliate nodes, the petals of the former species narrow, those of the latter broad.

Sophora tetraptera J. S. Mill. Ic. Pl. *pl. 1*. 1780.

Shrub or small tree with slender flexuous branchlets the younger as the leaves and racemes more or less rusty pilose; leaves with 4–40 pairs of linear-oblong to obovate leaflets, rounded or retuse at tip, 6–25 mm. long; racemes 2–8-flowered, pendulous, the golden yellow flowers 2.5–5 cm. long; calyx gibbous, the limb oblique; banner little reflexed; pods to 2 dm. long, 4-angled with 4 narrow wings, the valves scarcely dehiscing.—Highly variable in habit, size of flowers and leaflets and in shape of latter.—*S. tomentosa* L., similar in flower but pods not winged, is rather ashy tomentose with 5–9 (12) pairs of leaflets 2.5–4 cm. long and pale yellow flowers. *S. macrocarpa* Sm. has 10–20 pairs of leaflets, the fruit nodes not winged, tomentulose. All have been or are to be expected in cultivation.

Peru: Cultivated or escaped. Chile; New Zealand. "Mayú," "pelú."

5. DIPLOTROPIS Benth.

Trees with ample imparipinnate leaves, the leaflets alternate, and medium size pinkish-violet flowers borne in open terminal panicles or racemes. Bracts and bractlets minute. Calyx distinctly incurved, 5-toothed, the 2 upper teeth often nearly connate. Corolla

more or less papilionaceous, the blade of the banner with 2 lateral appendages at base (these obscure in *D. Martiusii*); wings and keel petals free, subequal, clawed. Stamens 10, free, unequal. Ovary sessile or shortly stiped, the slender style with small terminal slightly oblique stigma. Pods indehiscent with few soft exalbuminous seeds.—Cf. *Ormosia;* the segregate genera *Clathrotropis* Harms and *Ormosiopsis* Ducke have the banner unappendaged; but it may be smooth or calloused in other genera, even in this subfamily; Amshoff thinks the albuminous seeds a concomitant character. The former has white flowers, the seeds compressed with fragile testa, the latter yellow or lilac flowers, the globose seeds with testa thick usually red or bluish. The presence or absence of albumen as a basic character in taxonomy is certainly open to question.

Panurea Spruce, of the upper Amazon Valley, has simple ample coriaceous leaves, small yellowish racemose flowers, broad unappendaged banner, thick uncinate-inflexed style and plane acuminate bivalved pods; *P. longifolia* Spruce is the only known species.

The remarkable *Uleanthus erythrinoides* Harms, Verh. Bot. Ver. Brandenb. 47: 150 (with pl.). 1905, has seemingly only 1 petal (banner lilac) the others linear and included in the calyx, this obliquely infundibuliform, and, according to Ducke, compressed, elastically dehiscent pods, the wood fine-grained and hard but easily worked.

Diplotropis Martiusii Benth. in Mart. Fl. Bras. 15, pt. 1: 321. 1862.

Glabrous or glabrate unless for a rusty puberulent tomentum on the young parts and on the ample panicles; leaflets oblong-elliptic, lustrous both sides; petals scarcely 2 times longer than the calyx; standard obscurely auricled; ovary sericeous; otherwise apparently much like *D. ferruginea* Benth.—Pods to 5 cm. long, 2.5 cm. broad, with large reniform seeds.

Loreto: Mishuyacu, *Klug 1527* (det. Harms). Brazil.

Diplotropis peruviana Macbr., spec. nov.

Arbor; foliolis plerumque 7, fere oblongis, basi breviter et oblique rotundato-acutis, apice breviter obtuseque acuminatis vel interdum obtusis, ad 7 cm. longis, circa 3.5 cm. latis, coriaceis, dense reticulato-venulosis, supra sparse pilosiusculis demum glabratis haud nitidis, subtus molliter (vix dense) crispe villosis; paniculis 1.5 dm. longis dense subadpresseque ferrugineo-pilosis; calyce crasso circa

7 mm. longo; vexillum circa 9 mm. longum supra unguem utrinque auricula late appendiculatum ut videtur fere trilobatum; ovarium adpresse villosum.—Perhaps this specimen without fruit is incorrectly placed; the banner is nearly trilobed, the lateral appendages being almost as large as the terminal part of the blade; at one time I referred it to *D. ferruginea* Benth. of central Brazil, which it resembles.

Junín: Chanchamayo Valley, *Schunke 3252*, type.

6. ORMOSIOPSIS Ducke

Trees affine *Ormosia* but the calyx early herbaceous becoming indurate in fruit and persisting, the flowers yellow or pale lilac, the stigma terminal. Pods dehiscing, the seeds globose or subglobose, hard, with small hilum.—According to Pierce the leaflets are conspicuously reticulate but the secondary veins are not prominent. *Clathrotropis* Harms, similar and to be expected within Peru, has roseate or white flowers, the calyx straight, the seeds strongly flattened.

Ormosiopsis cuspidata Pierce, spec. nov.

Arbor 5–7 m. alta; foliola 3–5, subcoriacea, elliptico-ovata, apice abrupte breviter cuspidato-acuminata, basi rotundata vel acuta, 5–10 cm. longa, 3.5–5 cm. lata, utrinque glaberrima, venis lateralibus 5–8, adscendentibus, nervis transversalibus reticulatis prominentis; legumen 2 cm. latum, 5 cm. longum, sessile sed basi constrictum, apice anguste attenuatum, sparse tomentosum; semina 1–2, coccinea, subglobosa, 1 cm. longa (directus ad perpendiculum placentam), 1.4 cm. lata (ad parallelum placentam), et 0.7 cm. crassa, hilo lineari, 3 mm. longo.

Loreto: Yurimaguas, lower Río Huallaga, *Killip & Smith 29068* (type, N. Y. Bot. Gard.).

7. ORMOSIA Jacks.

Nearly *Diplotropis* but the leaflets opposite or subopposite, the flower dark purple or lilac, the calyx straight or nearly, the banner without auricles but often calloused above the claw, and, especially, the stigma lateral. Seeds with hard testa, red or rarely yellow sometimes red and black, their longest dimension, fide Pierce, usually perpendicular to the hilar surface. This authority has noted that the leaflets usually have prominent secondary veins and are not

conspicuously reticulate, characters in contrast to those of *Ormosiopsis*. Sometimes the seeds are mistaken for those of *Mucuna*.

Acknowledgment is made to Dr. John Pierce for permission to include description of his new species and for helpful suggestions.

Leaflets glabrous or merely puberulent beneath; pods plane.

Leaflets glabrous; calyx 12–15 mm. long; pods thin. . *O. macrocalyx.*

Leaflets puberulent beneath; calyx 6–8 mm. long; pods thick. *O. coccinea.*

Leaflets shortly villous beneath; pods rugose.

Leaflets 5–9; trichomes weak, matted. . . . . *O. amazonica.*

Leaflets 11–15; trichomes turgid, erect. . . . . *O. bopiensis.*

Ormosia amazonica Ducke, Archiv. Jard. Bot. Rio Jan. 3: 139. 1922. *O. euneura* Harms, Notizbl. Bot. Gart. Berlin 9: 972. 1926, fide Pierce.

Branchlets stout, more or less velvety tomentose as the rachis of the ample leaves, this bearing 3–4 pairs of petiolate obovate-oblong to oblong leaflets, their bases rounded or obtuse or that of the terminal one cuneately narrowed, all apiculate or shortly caudate-acuminate, coriaceous, glabrous and somewhat bullate above, distinctly reticulate and shortly villous beneath, 8–20 cm. long, 5–13 cm. broad; panicles ample, densely brown villous; bracts caudate-acuminate to 2 cm. long, a third as broad; pedicels 2–3 mm. long, the narrow bractlets 7–9 mm. long; calyx with upper lobes 8–10 mm. long; corolla glabrous, the banner emarginate; ovary shortly stiped, densely hirsute-villous.—Allied by both authors to *O. nobilis* Tul. of the lower Amazon but the inflorescence-pubescence looser and the bracts and bractlets larger, and, according to Ducke, the finally glabrate pods more rigid with 1–3 seeds, the larger 12–13 mm. broad; rather large tree, the foliage dense, very dark. Type of *O. euneura* from tree 11 meters high, 3.5 dm. in diameter, the banner reddish-lilac, the other petals lilac. F.M. Negs. 28237; 1908 (*O. euneura*).

Loreto: In flood-free woods, edge of the Itaya, Iquitos, *Tessmann 3665* (type, *O. euneura*). Brazil.

Ormosia bopiensis Pierce, spec. nov.

Arbor 15–20 m. alta; foliola 11–13, oblongo-ovata vel obovata, 12–25 cm. longa, 5–10 cm. lata, apice breviter acuminata, supra glabra, subtus undique ferrugineo-hirsuta, venis lateralibus 12–20,

nervis transversalibus prominentis; legumen tenuissimum, valde rugosum, 3–3.5 cm. longum, 2–2.8 cm. latum; semina rubra macula nigra, 1.3 cm. longa, 1 cm. lata, hilo ovali, 2 mm. longo.

Loreto: Mishuyacu, *Klug 669* (det. Harms, *O. euneura*). Bolivia.

Ormosia coccinea Jacks. Trans. Linn. Soc. 10: 360. *pl. 25.* 1810; 317. *O. subsimplex* Spruce ex Benth. in Mart. Fl. Bras. 15, pt. 1: 316. *pl. 125.* 1862, fide Ducke.

Young parts as leaflets beneath minutely pubescent the latter 7–11 pairs, oblong to ovate, obtuse or barely acuminate, glabrous and lustrous above, 7–12 cm. long, 3–6 cm. wide, the nerves prominent beneath, impressed above; panicles ashy or yellowish-brown tomentose, ample; pedicels 4 mm. long; flowers 12–14 mm. long, the calyx 6–8 mm. long; ovary subsessile, tomentose; pods glabrous, fleshy coriaceous, 3–4.5 cm. long, 2–2.5 cm. broad, the usually solitary seed red and black.—The Peruvian collection determined by Harms with remark "affine."

Loreto: Río Itaya, *Williams 3505.* To the Guianas.

Ormosia macrocalyx Ducke, Archiv. Jard. Bot. Rio Jan. 3: 137. 1922.

Essentially glabrous except for a short, very closely appressed indument on the ample inflorescence, rather dense only on the calyces, these 10–15 mm. long, broadly lobed; leaflets 9, oblong-elliptic to broadly elliptic, obliquely obtuse or acute at base, shortly and obtusely acuminate, 9–15 cm. long, 5–8 cm. broad, the 5–8 lateral nerves rather prominent both sides, the veins less so but obvious; flowers nearly 2 cm. long or longer, the broadly obovate banner minutely biappendiculate at base; ovary subsessile, densely pubescent; pods according to Pierce with thin valves, the seeds entirely red.—Near, fide Ducke, *O. excelsa* Benth. with 15–19 leaflets, smaller flowers. Tree 8 meters, with mulberry-colored flowers, seeds red and black, the wood good for lumber (Schunke).

Loreto: Río Mazán, *José Schunke 214.* Brazil.

8. MONOPTERYX Spruce

Large trees with high buttress roots, alternate imparipinnate leaves, the coriaceous leaflets estipulate, the flowers borne in terminal panicled racemes. Bracts and bractlets small, promptly caducous. Calyx-tube very short, the two upper lobes connate into a much

enlarged lip that includes the corolla, the much shorter lower one acute, entire or tridentate. Petals sessile, subequal, the banner broad, the wings free, the keel petals connate dorsally. Stamens free, the anthers narrow. Ovary stiped, 1-ovuled, the style short with lateral stigma. Pods compressed, elastically dehiscing.

The seeds, according to Ducke, boiled or roasted, furnish a culinary or illuminating oil; the reddish wood is very resinous and agreeably fragrant with the odor of balsam.

Monopteryx uaucu Spruce ex Benth. in Mart. Fl. Bras. 15, pt. 1: 307. 1862.

Leaves with 3–5 oblong-elliptic leaflets rounded at each end or shortly acute at apex, mostly 6–8 cm. long, 3.5–4 cm. broad on petiolules 5 mm. long or longer, glabrous and densely reticulate-veined, especially above; racemes mostly simple, many fascicled at the ends of the stout branchlets, about 1.5 dm. long, fulvous-canescent including the calyces, the bract-like upper lobes of these 10–12 mm. long; pods 1.5 dm. long, 4 cm. broad, strongly compressed, acutely margined, the flattened seeds 4 cm. long, 3 cm. broad.—The tree has been collected by Ducke at Tabatinga on the Brazil-Peru boundary. The other species known, *M. angustifolia* Spruce, has 5–9 oblong acuminate leaflets minutely tomentulose beneath.

Peru (undoubtedly). Northern Brazil. "Uacú."

9. TARALEA Aublet

Trees or shrubs with aspect and character of *Coumarouna* but the ovary subsessile or very shortly stiped, the plane compressed woody but bivalvate pod elastically dehiscent, the broad flattened seed oily but without odor. Leaves alternate or opposite.—The genus is academic but its recognition permits the use of *Coumarouna* for *Dipteryx*. *Coumarouna* probably should be conserved to include it; *Dimorphandra* and *Cassia*, to give only two examples, may have indehiscent or bivalvate elastically dehiscent pods.

Taralea oppositifolia Aubl. Pl. Guian. 2: 745. *pl. 298*. 1775. *Coumarouna oppositifolia* Taub. Bot. Centralbl. 47: 389. 1891.

Smooth gray-barked tree with much resemblance in flower to *Coumarouna;* leaf-rachis flattened, not produced; leaflets usually opposite, 6–8, elliptic, somewhat acuminate, 8–12 cm. long, 3–6 cm. wide, glabrous, rather coriaceous but pellucid-punctate; panicles

puberulent, the small bractlets promptly deciduous; calyx coriaceous, more or less ashy tomentulose but roseate, the tube about 3 mm. long, the upper lobes 5–6 mm. long, 3 mm. broad; petals about 7 mm. long, violet unless the yellow or partly yellow banner; ovary pubescent; pods glabrous, 5 cm. long, 3.5 cm. broad.—*T. nudipes* (Tul.) Ducke has alternate leaves, the nerves and veins inconspicuous, the calyx except at extreme base, petaloid; *T. cordata* Ducke is similar to *T. nudipes* but veins reticulate, fruit half as large as that of *T. oppositifolia*. The native name, meaning "false Cumarú," is applied also to *Andira* and *Apuleia* (Ducke). Illustrated (fr.), Ducke, Archiv. Jard. Bot. Rio Jan. 4. 71. 1925; Mart. Fl. Bras. 15, pt. 1: *pl. 119*.

Loreto: Iquitos (fide Ducke). Amazonian Brazil; Guiana. "Cumarú-rana."

10. COUMAROUNA Aublet

Dipteryx Schreb.

Reference: Ducke, Trop. Woods 61: 1–10. 1940.

Trees related to *Geoffroya* and with many characters in common but the subabruptly pinnate leaves and usually the leaflets alternate, sometimes pellucid-punctate, estipulate, the calyx often colored and punctate glandular, scarcely with obvious tube but with 2 conspicuous larger upper lobes that are coriaceous or petaloid and wing-like, the 3 lower lobes reduced. Banner emarginate to bifid. Alternate anthers smaller or aborted. Ovary glabrous or rarely pilose, attenuate at base. Pods drupaceous, indehiscent.

Taralea Aubl., long confused with this, has usually opposite leaves, ovary tomentose, minutely stiped, attenuate above into style, the pods bivalvate. *Dipteryx* is conserved only for those botanists who include *Taralea* in *Coumarouna* and therefore no action of a botanical congress is necessary, as Ducke has suggested, to permit the use of the Aublet name by those accepting both genera. *Dipteryx* Schreb. was placed on the list of Nomina Conservanda when the genera of Aublet were thought to be synonyms. Since as Ducke now has shown they can be distinguished, *Dipteryx* as a conserved name is certainly invalidated, standing for different entities and creating, if used, an endless source of confusion. Schreber's name is purely academic and based on error. Cf. also Ducke, "O. Cumarú," Minist. Agric. Serv. Florest. Rio Jan. 1939 (4 pages, 3 plates).

C. odorata is the chief source of the "tonka bean," the "cumarú" of commerce, the seed of which furnishes coumarin, used in perfume

and medicine and as a common adulterant of or substitute for vanilla as well as a flavor for tobacco. The brown ovoid pods of this and related species when fresh are oily to the touch and emit an aromatic and to many, agreeable odor, as does the whitish seed which is the "tonka bean." According to Ducke the flowers of some species are very beautiful, the wood so hard and heavy that the trees are rarely cut. I acknowledge with thanks my indebtedness to Ducke's excellent treatment.

Ducke helpfully calls attention to other Leguminosae apt to be confused with these important trees, for example, *Taralea*, similar in leaves and flowers, *Apuleia molaris* as to trunk and *Geoffroya inermis* as to fruits; the native name "cumarú-rana" may be applied to any of these. On the other hand "cumarú de rato" is *Poecilanthe effusa* and "cumarú de cheiro" or "imburana de cheiro" is a species of *Amburana*.

Calyx coriaceous; drupe and seeds odorous.

Calyx wings pulverulent, 15 mm. long.....*C. charapilla.*

Calyx wings densely rusty tomentose, 10–12 mm. long.

C. odorata.

Calyx membranous, the wings petaloid; plants not cumarin scented.

Leaflets 4 or 6.....*C. ferrea.*

Leaflets 9–11.....*C. micrantha.*

Coumarouna charapilla Macbr., spec. nov.

Arbor *C. odorata* affinis, foliolis usque 8, alternis, ad 17 cm. longis, 7 cm. latis, paniculis solum minutissime puberulentis, etiam calycis; calycis alae 15 mm. longae, 7 mm. latae, oblongae, apice rotundatae; petala calycis alis distincte breviora.—In spite of the fact that the material is imperfect (bractlets and fruit unknown, flowers all detached) it probably represents a new species; it differs from *C. odorata* as noted and from *C. rosea* (Spruce) Taub. in the smaller flowers; in the latter, moreover, the lower calyx lobe is distinctly 3-toothed. In *C. charapilla* the calyx is exceptionally hard, even woody, the lower lobe is most obscurely toothed and the puberulence is so fine that the collector's "flowers mulberry color" probably refers to the color of both calyx and petals. The type was from a solitary tree 18 meters high.

Loreto: River bank, Mancayatca, Río Mazán, *José Schunke 362*, type. "Charapilla."

Coumarouna ferrea Ducke, Rev. Bot. Appl. 14: 403. 1934.

Tree with nearly smooth brown bark, the tall trunk deeply buttressed; rachis winged, long produced at tip, the opposite leaflets (petiolules 4–8 mm. long) 2–3 pairs, the larger known 11 cm. long, 5 cm. broad, strongly inequilateral, rounded at the very oblique base, ordinarily shortly and obtusely acuminate, the tip itself minutely retuse, thin-coriaceous, concolor, slightly lustrous above, impunctate, the nerves and veins very fine; panicles ample, dense, the pedicels 2–3 mm. long, the ashy-puberulent bract and bractlets promptly caducous; flowers fragrant, the calyx conspicuous, glandular, the tube about 3 mm. long, the lower lip distinctly 3-toothed, the 2 upper lobes 9–11 mm. long, 4–5 mm. broad, petaloid; drupe to 5 cm. long, 3 cm. broad.—A big tree, 40–50 meters high, with dark brown bark and supported by huge buttresses, the wood very hard. When in flower the bright rose crown which rises high above the common level of the forest affords a beautiful sight (Ducke). Near *C. magnifica* Ducke of Brazil, but that has 6–14 acuminate leaflets, seeds not odorous.

Río Acre: Seringal Iracema, upper Purús, (*Huber*, fide Ducke). Brazil. "Cumarú ferro."

Coumarouna micrantha (Harms) Ducke, Trop. Woods 61: 9. 1940. *Dipteryx micrantha* Harms, Notizbl. Bot. Gart. Berlin 9: 976. 1926.

Glabrous except the minutely puberulent ample many-flowered panicles; leaf-rachis grooved above, narrowly winged, to 3 dm. long, apically long-appendaged (produced); leaflets 9–11, usually alternate, petiolulate (2–4 mm.), oblong or nearly, rounded and slightly emarginate at base, very shortly acuminate, 5–10 cm. long, about 4 cm. wide, subcoriaceous, lustrous above, densely and minutely pellucid-punctate; bractlets oblong-lanceolate, rather promptly deciduous; calyx nearly glabrous, the tube 2.5 mm. long, the wings 8 mm. long, 3.5 mm. wide, sparsely and not conspicuously gland-dotted; ovary and style glabrous; fruit oily, edible (fide collector).—The common name according to Ducke is a diminutive of the Quechua word for turtle, "charapa," and refers to the form of half a fruit-shell. To 40 meters high, the hard wood used for constructing boats (Klug). F.M. Neg. 2327.

Loreto: Mishuyacu, *Klug 980* (det. Harms). San Isidro, mouth of the Pastazza, *Tessmann 4964*, type. "Kumarut," "charapilla."

Coumarouna odorata Aubl. Pl. Guian. 2: 470. *pl. 296*. 1775. *Dipteryx odorata* (Aubl.) Willd. Sp. Pl. 3: 910. 1803.

Tall tree, at least in virgin forest, with rather smooth but scaly yellowish brown bark; leaf-rachis winged, tomentose, long produced at tip; leaflets 4–6 (8), oblong, acuminate, coriaceous, glandular, not pellucid-punctate, commonly 10–15 cm. long, 4–6 cm. wide or larger; panicles ample, rather loosely flowered, rusty tomentulose, the calyx wings uniformly so, these coriaceous, 10–12 mm. long; lower calyx-tube 3-toothed; flowers, except whitish banner, rose-color, 12 mm. long; ovary glabrous; drupe with oily and aromatic-smelling pericarp, inedible.—Leaflets as many as 8 on young shoots, alternate or opposite. The flowers are very fragrant, the stems and branchlets with a pea-like smell; furnishes the larger part of the cumarú exported from Pará (Ducke). That originating in Venezuela is *C. punctata* Blake, according to Pittier. The similar *C. rosea* (Spruce) Taub. has calyx wings 20–21 mm. long and leaf-rachis scarcely or shortly produced.—The other species of importance said to yield "the best cumurú of Brazil" is *C. trifoliolata* Ducke, leaflets 3 (2), pericarp of fruit sweet, edible. Sometimes attains 30 meters.

Río Acre (probably, fide Ducke). Brazil; Guiana.

11. GEOFFROYA L.

Andira Lam.

Large trees with alternate unequally pinnate leaves, their leaflets usually opposite and roseate or violet and fragrant or yellow and malodorous flowers, these often subsessile and crowded in terminal or subterminal panicles or simply racemose. Bracts and bractlets commonly small and caducous. Calyx truncate or shortly to deeply dentate. Banner suborbicular, unappendaged, the wings and keel petals oblong, obtuse, free. Vexillar stamen usually free, the anthers versatile. Ovary more or less long-stiped, (1) 2–4-ovuled, the drupaceous ovoid-globose pod with one seed.—*Andira* has been maintained chiefly on the grounds of an obscurely toothed calyx and panicled fragrant violet flowers; the leaflets vary in venation much as *Machaerium*. Name sometimes written "*Geoffraea*."

Flowers yellow; calyx distinctly dentate.....*G. striata*.
Flowers not yellow; calyx obscurely dentate.
Leaflets glabrous.....*G. inermis*.
Leaflets puberulent beneath.....*G. surinamensis*.

Geoffroya inermis Wright, Lond. Med. Journ. 8: 256. 1787. *Andira inermis* (Wright) HBK. Nov. Gen. & Sp. 6: 385. 1824. *Vouacopoua inermis* (Wright) Lyons, Pl. Names Sci. & Pop. 396. 1900.

Typically glabrous except for the rusty-yellowish puberulent tomentosity of the usually many-flowered panicles and the younger petioles; leaves abundant with 9 (15) oblong or oblong-elliptic acuminate petiolulate subcoriaceous leaflets, lustrous above, commonly 5–8 cm. long, 2.5–3.5 cm. broad; stipels sometimes conspicuous, setaceous; flowers roseate violet, about 1 cm. long, the slender claw of the banner subequaling the obtusely based campanulate calyx, this subtruncate, scarcely 4 mm. long; ovary glabrous or nearly, the stipe exserted; drupe obliquely obovoid, apiculate.—Attains 30 meters (Krukoff). Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 116.*

San Martín: Pongo de Cainarachi, *Klug 2763* (det. Standl. with query). Tarapoto, *Spruce 4115.* Juanjuí, *Klug 4309* (det. Standl.). —Loreto: Middle Marañón, *Tessmann 3836* (det. Harms). Balsapuerto, *Klug 2843; 3108.* American tropics and West Africa. "Angelim," "angelim da varzea."

Geoffroya striata (Willd.) Morong, Ann. N. Y. Acad. Sci. 7: 87. 1892; 299. *Robinia striata* Willd. Sp. Pl. 3: 1132. 1803. *G. superba* Humb. & Bonpl. Pl. Aequin. 2: 69. *pl. 100.* 1809.

Leaflets alternate or irregularly opposite, commonly about 15 (13–25), obovate-oblong, obtuse or retuse, lightly pilose both sides or rarely glabrous, 16–20 mm. long, 6–8 mm. broad; racemes ashy or rufescently tomentulose, subequaling the leaves; calyx acute at base, 6–7 mm. long, incurved, the teeth nearly 2 mm. long, the pedicels 2–3 mm. long; banner glabrous, twice as long as the calyx; ovary sessile, tomentose, with 4 ovules, the ovoid or subglobose ligneous pod the size of a walnut, maturing one ovoid oblong seed.—The fruits are very oily but not edible (Raimondi). Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 117.* F.M. Neg. 2352.

Piura: Río Quiroz, (*Raimondi*, det. Dahlem as *G. superba*).—Tumbez: Rainy-green formation, coastal plain, Hacienda la Choza, *Weberbauer 7719;* also near Zarumilla, *7622.*—Cajamarca: Playa de Nanchoc, (*Raimondi*, det. Dahlem as *G. superba*). Bolivia; Galapagos Islands; Venezuela; Brazil. "Seca," "almendro" (Raimondi).

Geoffroya surinamensis Bondt de Cort. Geoff. Surin. 13. (with fig.) 1788. *Andira surinamensis* (Bondt) Splitg. ex Pulle,

Enum. Pl. Surin. 229. 1906. *A. retusa* (Lam.) HBK. Nov. Gen. & Sp. 6: 385. 1824. *G. retusa* Poir. in Lam. Dict. 8: 182. 1808. Illustr. *pl. 604.* 1797. *Vouacopoua retusa* (Poir.) Lyons, Pl. Names Sci. & Pop. 396. 1900.

Minutely pilose-puberulent on the petioles and the under surface of the leaflets, these oblong-elliptic or oblong-obovate, rounded or retuse both ends, coriaceous, lustrous above, rather prominently reticulate-veined beneath; panicles lax, minutely tomentulose, the pedicels 2–3 mm. long; calyx about 6 mm. long, narrowed at base, the petals twice as long; ovary glabrous with stipe exserted after anthesis; drupe ovoid, glabrous, about 4 cm. long.—Attains 25 meters (Krukoff). Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 115.*

Loreto: Río Mazán, *José Schunke 181.*—Río Acre: On terra firma, mouth of Río Macauhán, *Krukoff 5483.* Brazil; the Guianas; Trinidad. "Huayruzo," "angeline," "morregueíra."

12. DERRIS Lour.

Lonchocarpus HBK. Nov. Gen. & Sp. 6: 383. 1824.

Reference: Benth. in Journ. Linn. Soc. Bot. 4: Suppl. 85–101. 1860.

Trees, less frequently lianas, with alternate oddly pinnate leaves (the leaflets usually opposite, usually petiolulate, rarely solitary), the violet-purple or white or white and yellow flowers borne in simple racemes or in narrow panicles, the pedicels usually paired or fasciculate. Bracts and bractlets caducous or the latter rarely subpersistent. Calyx truncate, the teeth minute or obsolete. Banner appendaged or not. Keel obtuse, the petals lightly connate dorsally as also the wings. Vexillar stamen free below the middle where ordinarily united with the others in a closed tube, the anthers versatile. Ovary somewhat stiped, 2–many-ovuled. Pods oblong or elongate, emarginate or the upper sutures sometimes dilated or one or both wing-extended, plane, membranous or coriaceous, indehiscent. Seeds usually 1 or 2, compressed, reniform or suborbicular.

Genus is a source of rotenone, "one of the most potent insecticidal constituents of plants used by South American natives as fish poisons"; cf. Krukoff & Smith, Amer. Journ. Bot. 24: 576–587. 1937 (from the taxonomic part of which I have largely drawn), who give a bibliography and much economic and commercial information.

The commercial importance of this group makes an explanation of the use of the name *Derris* instead of *Lonchocarpus*—the name

commonly employed for at least most of the American species known to be rich in rotenone—apropos. Both names are antedated by earlier synonyms but as both are on the list of Nomina Conservanda the earlier, *Derris*, is to be used if the genus is defined in its natural sense, as indicated by Bentham, the first great authority on these plants, Journ. Linn. Soc. Bot. 4: Suppl. 7. 1860. There, wishing to discuss their distribution and that of allied genera, he wrote: "We must take natural genera only, those which have general differences traceable in their flowers or other organs and not determined by the form of the pod, uniting *Ecastaphyllum* with *Dalbergia*, *Drepanocarpus* with *Machaerium*, *Lonchocarpus*, *Pongamia*, *Piscidia* and *Muellera* with *Derris*, *Andira* with *Geoffroya* and *Pterodon* with *Dipteryx*. We shall then find the two largest genera and one smaller common to three continents."

Since this was written *Dalbergia* and *Machaerium* have been redefined to include the genera mentioned and recently Ducke (Trop. Woods 69: 2–7. 1942) has united under one name all the American species previously referred to *Lonchocarpus* or *Derris*. Unfortunately he has employed the later name *Lonchocarpus*, remarking that "for lack of sufficient material the two genera cannot now be strongly differentiated but it is convenient to maintain the names because of the large number of species they contain." Obviously this at best could be only a provisional disposition of the species; the large number of specimens which I have seen in European herbaria as well as in those of the United States has impressed upon me the conclusion reached a number of years ago that Bentham was correct, namely, that we are concerned with only one natural genus. But a résumé of the situation is desirable.

Derris as to original species "has the flat pod of *Lonchocarpus*, varying likewise in consistency from thin and membranous to thick and almost woody, without, however, any special thickening of the upper suture; and it is generically distinguished by the upper edge, and sometimes the lower one also, being bordered by a narrow longitudinal wing, which varies, like the pod itself, in consistency but is always distinctly marked off by a prominent long vein or nerve on each side indicating the real suture." (Bentham.) But in Tulasne's Brazilian genus *Neuroscapha*, merged by Bentham himself in *Lonchocarpus*, the pod, as Bentham observes, in *degree* thickens at the seed-bearing suture, sometimes providing a flat or concave surface to the edge of the pod that may be as much as 6 mm. wide. And the oriental *Derris glauca* Merr. & Chun. simulates closely the

Neuroscapha group, while the African *D. leptorhachis* Harms has pods with a thickened upper suture that is medially lined or barely margined. It seems clear that the long vein or nerve that ordinarily sets off the wing-like margin of the pods of many species is a character sufficiently diagnostic to make it possible to classify the species sectionally but it is questionable indeed if there would be any natural arrangement in such a division, for the wing of *Derris* too is developed in varying degree! If pods winged or margined on one edge is a diagnostic generic character pods winged on both edges must be as important as well as pods not winged at all. Bentham himself rejected such "logical" generic segregation, l.c. 22, showing clearly that there are not concomitant characters, even as there are none as regards *Lonchocarpus* (pods wingless) and *Derris*. He retains *Piscidia*, the "lateral expansion of the sutures" resulting in four wings, but it is noteworthy that this plant in flower is sometimes difficult to distinguish, at least in the herbarium, from *L. guatemalensis*. As Bentham remarks, the pods of some species of *Sesbania* in another tribe (*Galegeae*) are similar in wing-development; in *Dimorphandra*, *Cassia* and elsewhere in the family the pods within the same genus may or may not be winged at one or more sutures. Obviously the winging of the pod in *Derris* is of no more taxonomic significance than it is for example in *Machaerium*. Related is *Muellera* of Linnaeus with a "thick fruit nearly circular in its transverse section"; in one species it is one-seeded and ovoid or ellipsoid, in the other and more common one it is elongate and usually several- to many-seeded and nearly parted between the seeds so that "in its perfect state it resembles a string of large beads." What diversity is here!

Returning to Bentham's assertion quoted above that the natural genus here includes *Lonchocarpus*, *Pongamia* (Asian and exactly *Lonchocarpus* except for a more fleshy pod with blunt sutures), *Piscidia* and *Muellera*, I suggest that the taxonomy of these plants, many of them so important in commerce, will be greatly clarified and at the same time present more exactly the true development and comparative relationship if *Derris* is drawn to include *Lonchocarpus*, while *Muellera*, *Pongamia* and *Piscidia*, especially the first, may well be retained (as by Bentham) as small offshoot groups; *Muellera* has a definite character; *Pongamia* and *Piscidia* are evidently only extreme developments in the fruit and thus while purely academic may, especially in floristic work, be conveniently recognized. Finally it may be noted that this disposition would conform to usual taxon-

omy as practiced in all families, with the majority of closely related species grouped under one name while extreme forms are left at the edge so to speak in separate groups if desired. Indeed this is exactly what has been done (Ducke and Hoehne) in uniting *Drepanocarpus* (wingless pods) with *Machaerium* (more or less winged), a procedure already suggested by Bentham. Thus in tribe *Pterocarpeae* we have a delimitation of genera analogous to that proposed here for the *Lonchocarpeae*.

Flowers geminate, regularly or irregularly racemulose, often sessile; leaf-rachis grooved above or the leaflets pellucid-punctate.

Banner not calloused; leaflets 3–5, glabrous, more or less punctate. *D. confertiflora.*

Banner bicalloused at base; leaflets usually 7 or more, if fewer, puberulent beneath or if fewer and glabrous, not punctate.

Leaflets densely villous beneath; ovary densely villous, ovules about 10 ..... *D. hedyosma.*

Leaflets glabrous or sparsely, minutely pubescent; ovules 3–8.

Leaflets not pellucid-punctate; inflorescence spiciform or racemiform.

Leaflets, at least typically, 7–11 or the ovules 6–8.

Leaflets mostly or all only 5–7.5 cm. long; ovules 6–8; pods coriaceous, the upper margin broadly dilated. *D. Guilleminiana.*

Leaflets longer; ovules 3–4; pods thinner, the upper suture merely acute ..... *D. spiciflora.*

Leaflets 5; ovules 3 ..... *D. seorsa.*

Leaflets pellucid-punctate; inflorescence a narrow panicle. *D. hylobia.*

Flowers fasciculate on short often nodosiform peduncles; leaflets, if pellucid-punctate, with grooved rachis (*L. glabrescens*).

Pods not wing-margined; stems minutely striate-ridged longitudinally.

Leaflets unless the terminal one rarely more than 7 cm. long, more or less obviously reticulate-pellucid; keel strongly arcuate; ovules many (8–18) ..... *D. glabrescens.*

Leaflets distinctly longer, at least 10 cm. long, not punctate; ovules few (1–4).

Pubescence on leaflets beneath minute, sparse, obscure; wings often strongly falcate ..... *D. sylvestris.*

Pubescence obvious (under lens), rather dense; wings nearly straight (in *L. nicou* unknown).

Leaflets commonly 3–5 (9), about half as broad as long. *D. rariflora.*

Leaflets commonly 7 (rarely 5 or 9), narrower.

Leaflets usually acute at base, gradually acuminate. *D. nicou.*

Leaflets usually rounded at base, abruptly acuminate. *D. urucu.*

Pods wing-margined, with a nerve between wing and suture; stems cylindrical or somewhat angled.

Leaflets 7–9; banner cordate at base. . . . . *D. amazonica.*

Leaflets commonly 5; banner obovate. . . . . *D. pterocarpa.*

Derris amazonica Killip, Journ. Wash. Acad. Sci. 24: 48. 1934. *Lonchocarpus negrensis* Benth. Journ. Linn. Soc. Bot. 4: Suppl. 98. 1860, not *D. negrensis* Benth. *Deguelia amazonica* Killip, l.c., not Taub.

With the habit of *D. pterocarpa* but the leaves usually with 9 leaflets on densely brownish sericeous petiolules 4–7 mm. long, the blades chartaceous or scarcely coriaceous, dark green and lustrous above, contrastingly paler and pilose beneath, the trichomes more or less spreading, becoming about 2 dm. long, half as broad, mostly somewhat smaller, rather shortly caudate acuminate; racemes densely brown-sericeous; pedicels 4–8 mm. long; calyx 4–6 mm. long; banner broadly obovate, to 11 mm. long and broad; pods oblong, obtuse at both ends, densely golden sericeous, to 12 cm. long, 2.5 cm. broad, the membranous wing 2–6 mm. broad.—Ducke, Trop. Woods 69: 6. 1942, has observed that this species is closely allied to *L. floribundus* Benth. mentioned here under *D. sylvestris* but that the margined pod resembles that of *D. pterocarpa*. According to Krukoff and Smith, l.c. 576, the plants are scattered in sandy soils, the grayish white roots (when cut) showing little latex, their rotenone content small. F.M. Neg. 2315.

Loreto: Middle Marañón, *Tessmann 3833* (det. Harms). Brazil; Guiana.

Derris confertiflora (Benth.) Macbr., comb. nov. *Lonchocarpus confertiflorus* Benth. Journ. Linn. Soc. Bot. 4: Suppl. 96. 1860.

Typically glabrous except for the finely silky puberulent racemose panicles; petioles narrowly grooved above; leaflets 3–5, broadly

oval-elliptic or subovate, rounded or barely acute at base, shortly acuminate, 6–8 (13) cm. long, 4–6 (8) cm. wide, early membranous and typically pellucid-punctate, becoming coriaceous and obscurely punctate; panicles dense, floriferous nearly to base, the short branchlets more or less lengthening out, the flowers sessile; bracts and bractlets minute, caducous or more or less persisting; flowers 10–12 mm. long, the banner unappendaged, finely sericeous without; calyx scarcely 2 mm. high; ovules 5(?) (Bentham); pods unknown.—F.M. Neg. 2308.

San Martín: Juanjuí, flowers white and cream, 4-meter tree, *Klug 3766*. Tarapoto, *Spruce 4219*, type; tall tree, *Williams 6711*. Chazuta, flowers violet, *Klug 4311* (det. Standl.).

Derris glabrescens (Benth.) Macbr., comb. nov. *Lonchocarpus glabrescens* Benth. in Hook. Journ. Bot. 2: 33. 1850; 100. *L. boliviensis* Pittier, Contr. U. S. Nat. Herb. 20: 93. 1917?

Liana, the slender branchlets and grooved petioles glabrate; leaflets usually 9, nearly oblong, acute or rounded at base, shortly acuminate, 5–7.5 cm. long, 2.5–4 cm. wide, in age scarcely subcoriaceous, not truly punctate but reticulate-pellucid, glabrous above, slightly and minutely appressed pilose beneath, the midnerve and 5–7 lateral nerves rather prominent both sides; racemes floriferous nearly to base, to several dm. long, nodose from the short peduncles; pedicels fasciculate, about 4 mm. long; bracts small, oblong-orbicular, caducous; calyx broadly campanulate, finally cyathiform, truncate, minutely 4-dentate, the broader upper tooth scarcely conspicuous; banner 12 mm. long, broadly orbicular, recurved, minutely sericeous; wings strongly arcuate; staminal tube entire nearly to base; ovary sessile, tomentulose, the ovules about 10; style sparsely hirtellous; pods coriaceous, apparently transversely articulate, 10–15 cm. long, 12–14 mm. wide, 3–9-seeded.—Nearly *L. densiflorus* Benth., 99, of Colombia and British Guiana, but the leaflets larger, racemes longer and axillary or terminal instead of arising from the leafless part of the older wood, and the pod coriaceous (Bentham). Type not seen; the Peruvian material seems to be the same as Pittier's plant which however as to type has "16–18 ovules." The lowest peduncles may sometimes lengthen to 8 mm. Woody vine climbing to 50 meters or higher; flowers pale blue (Killip & Smith).

Loreto: Above Iquitos, *Killip & Smith 29400*. Soledad on Río Itaya, *Killip & Smith 29759*. Canchahuaya, Río Ucayali, (*Huber 1395*). Brazil; Bolivia? "Barbasco."

Derris Guilleminiana (Tul.) Macbr., comb. nov. *Lonchocarpus Guilleminiana* (Tul.) Malme, Arkiv. Bot. 23A, no. 13: 30. 1931. *Neuroscapha Guilleminiana* Tul. in Ann. Sci. Nat. sér. 2. 20: 137. 1843; Arch. Mus. Hist. Nat. Par. 4: 76. *pl. 6.* 1843. *L. Neuroscapha* Benth. Journ. Linn. Soc. Bot. 4: Suppl. 89. 1860.

Younger branchlets or petioles usually more or less rusty puberulent as the racemes and in some forms the leaflets beneath, or these strigillose or glabrous; leaflets 7–13, ovate or oblong, commonly 7–10 cm. long, 5 cm. wide, rounded or connate at base, more or less acuminate; racemes solitary in the axils or panicled above, 7–10 cm. long; pedicels geminate, about 2 mm. long; bractlets beneath calyx, caducous; flowers violet, about 8 mm. long or somewhat longer, the banner sericeous, emarginate, somewhat calloused on the plicate auricles; ovary tomentose, with 6–8 ovules, pods coriaceous, glabrescent, to 7 cm. long, nearly 2 cm. wide, the upper suture broadly cymbiform or concave-dilated.—The Peruvian material with apparently fewer leaflets resembles *D. seorsa* but it has ovary with 6 ovules and the silky banner is reflexed. Illustrated, Mart. Fl. Bras. 15, pt. 1. *pls. 90, 100.*

Loreto: Mouth of Santiago, *Tessmann 3991* (det. Harms). Brazil.

Derris hedyosma (Miq.) Macbr., comb. nov. *Lonchocarpus hedyosmus* Miq. Linnaea 18: 564. 1844. *L. macrocarpus* Benth. var. *sericophyllus* Benth. Journ. Linn. Soc. Bot. 4: Suppl. 91. 1860.

Branchlets closely lenticellate, the younger as the racemes tomentose, the latter amply paniculate; stipules subulate, promptly caducous; leaflets 7–9 (17) oblong or oblong-lanceolate, acute or acuminate, 6–12 cm. long, a third as broad, densely appressed silky-pilose beneath, glabrate above, membranous; pedicels slender, 3 mm. long, binate at tip of a peduncle as long; calyx broadly campanulate, about 5 mm. long, only the 3 acute lower teeth distinctly developed; banner and wings ashy sericeous without, the lower clawed, to 14 mm. long, about as broad, bicalloused at base, emarginate; filaments slightly pilose; ovary densely villous; pod stiped, flat, oblong, acute both ends, more or less constricted between the 1–4 reniform seeds, subcoriaceous, to 1 dm. long, 2.5 cm. wide.—Description after Amshoff. F.M. Negs. 2313; 28165 (*L. macrocarpus*).

Loreto: Yurimaguas, *Spruce 4597* (type, Bentham var.). Brazil to Guiana; Bolivia?

Derris hylobia (Harms) Macbr., comb. nov. *Lonchocarpus hylobius* Harms, Notizbl. Bot. Gart. Berlin 9: 975. 1927.

Tall, nearly glabrous tree, the bark of the branchlets pale; leaflets 4–5 pairs (slender petiolules 5–7 mm. long), oblong-lanceolate, acute to obtuse at base, somewhat acuminate, 5–13 cm. long, 3–6 cm. wide, glabrous or slightly puberulent beneath, there the 7–10 or more nerves prominent, papyraceous; panicles ample, 3–5 cm. long, puberulent; pedicels solitary or geminate, 3–5 mm. long; calyx nearly 5 mm. long, 6–7 mm. broad; banner sericeous without, 12 mm. long, 9 mm. wide, ovary with stipe villous, the ovules 3–4.—Nearly *D. glabrescens* but flowers not fascicled. To 40 meters high, 15 meters to first branch, flood-free woods; flowers carmine, visited by bees (Tessmann). F.M. Neg. 2312.

Loreto: Mouth of Santiago, *Tessmann 4032*, type.

Derris nicou (Aubl.) Macbr., comb. nov. *Robinia nicou* Aubl. Pl. Guian. 771. *pl. 308*. 1775. *Lonchocarpus nicou* (Aubl.) DC. Prodr. 2: 261. 1825. *L. utilis* A. C. Smith, Amer. Journ. Bot. 24: 580. 1937.

Character in general that of *L. urucu;* petioles to 2 dm. long; leaflets 2–4 usually in cultivation 7 (rarely 5 to 9), oblong or elliptic or elliptic-lanceolate, 12–35 cm. long, 4–12 cm. wide, acute at base, more or less gradually caudate-acuminate, appressed pilose beneath including the 6–10 arcuate ascending lateral nerves.—In Journ. Wash. Acad. Sci. 20: 75. 1930 Killip & Smith identified this plant as *L. nicou* (Aubl.) DC., the type from Guiana with, according to Smith, l.c., considerably smaller and shorter leaflets and with the secondary nerves straight. In our judgment there is no essential difference that can be regarded as specific. The species is one of the constituents of curare; cf. Killip & Smith, Bull. Torrey Club 66: 305. 1939. The roots, though comparatively small, provide the bulk of cube or barbasco exported from Iquitos, according to Smith.

Ayacucho: Basin of Apurímac, *Killip & Smith 22913; 23053.*—Junín: Basin of Ucayali, *Killip & Smith 23878; 26200; 26369; 26712*, and others.—Loreto: Basin Ucayali, *Killip & Smith 27565; 27994; 28300; 29066*, and many others. Basin Río Marañón, *Killip & Smith 26886; 27278*, type; *27362; 29957*, and many others.—Río Acre: Basin Jurua, *Krukoff 5210; 7717; 7718.* Ecuador; Amazonian Brazil; Guianas. "Barbasco," "cube," "cube de almidón," "coñapi," "pacai," "timbo" (Peru), "timbo legitimo," "timbo branco" (Brazil).

Derris pterocarpa (DC.) Killip, Journ. Wash. Acad. Sci. 26: 360. 1936. *Lonchocarpus pterocarpus* DC. Prodr. 2: 260. 1825.

Deguelia scandens Aubl. Pl. Guian. 2: 750. *pl. 300.* 1775, not *Derris scandens* Benth. *Derris guianensis* Benth. Journ. Linn. Soc. Bot. 4: Suppl. 106. 1860.

High-climbing liana, the leaflets usually 5, the younger parts including the fasciculately flowered racemes somewhat reddish brown pilose; leaflets ovate or oblong-elliptic, rounded-subcordate at base, more or less acuminate, usually about 8 cm. long, half as broad, rather lustrous above, pale and sometimes a little pubescent beneath, subcoriaceous; bracts at base of racemes often stipule-like and conspicuous; pedicels 2–4 mm. long; calyx 3 mm. long; petals about 8 mm. long, yellowish; pods sessile, membranous, sparsely and minutely setulose, veiny, rounded at base, to 9 cm. long, sometimes longer, about 2 mm. broad at the seed, the wing 2.5–3 mm. wide.—According to Ducke, Trop. Woods 69: 5. 1942, this is a high-climbing vine in upland rain forests as well as on river banks but is not used as a fish poison. *D. negrensis* Benth., similar, has leaflets minutely pubescent beneath, racemes rusty tomentose, pods ovate obtuse, puberulent, coriaceous; *D. longifolia* Benth., pubescent as *D. negrensis* but leaflets narrowed at base, pods membranous, the younger reddish-velutinous, and, as suggested by Amshoff, the apparent difference between the two species is possibly due to age. Part of the material cited has open, part dense, inflorescence and its determination without fruit is not entirely certain. Both Ducke and Pittier have taken up the earlier name of Aublet contrary to the International Rules since his cognomen is already in use in the genus as pointed out by Killip. Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 107.*

Loreto: Iquitos, *Tessmann 3637* (det. Harms); *Mexia 6420.* Río Mazán, *José Schunke 111.* Balsapuerto, *Klug 3067.* Mishuyacu, *Klug 1023* (det. Harms). Brazil; the Guianas.

Derris rariflora (Benth.) Macbr., comb. nov. *Lonchocarpus rariflorus* Benth. Journ. Linn. Soc. Bot. 4: Suppl. 98. 1860.

Shrub finally developing high-climbing branches; petioles terete, 5–12 cm. long; rachis and petiolules, these 3–7 mm. long, hispidulous; leaflets 3 or 5 (rarely 7, exceptionally 9), more or less coriaceous, lustrous above, nearly concolor, oblong-elliptic, 9–25 cm. long, 4–11 cm. broad; usually rounded or subcordate at base, abruptly acuminate, the costa little developed above and glabrous, very prominent beneath and hispidulous as the 5–7 lateral nerves, the surface itself subappressed-pilose; inflorescence to 5 dm. long, the rachis spreading pilose, the peduncles 2–4 (10) cm. long, the

pedicels 2–3 mm. long, brown sericeous as the basally bibracteolate cupuliform calyx, this 3–4 mm. long, about 4 mm. broad; petals blue to pink, more or less sericeous, especially the suborbicular banner, this 6–8 mm. long, 7–10 mm. broad; wings nearly straight; ovary densely and evenly golden sericeous, the ovules 2 (3); pods elliptic-oblong, 3–4 cm. long, 2–3 cm. broad, obtuse and often apiculate at apex, strongly compressed, permanently golden sericeous, papyraceous, 1-seeded.—Description after Krukoff & Smith who note that the fresh roots are bright yellow when first cut, exuding a yellowish latex, their bark roughened as though warty, suggesting the skin of a Brazilian frog to which resemblance the common name "cururú" refers. Illustrated, Krukoff & Smith, l.c. 576 (fr.).

Loreto: Iquitos (fide Krukoff). Amazonian Brazil; British Guiana. "Timbo cururú," "cururú," and "timbo-amarillo."

Derris seorsa Macbr., spec. nov.

Arbor; ramis glabratis lenticellis albis verrucosis; petiolis supra anguste canaliculatis; foliolis 5 fere oblongo-ellipticis basi subacutis, apice breviter acuminatis, 6–10 cm. longis, 3.5–5 cm. latis, chartaceis, supra glabris, subtus minute sparseque adpresse pilosis, nervo médio et lateralibus (7 vel ultra) prominulis; racemis puberulis ad 12 cm. longis (folio brevioribus), floribus plerisque geminis vix 10 mm. longis; pedicelli et pedicellis propriis circa 1.5 mm. longis, bracteolis calyce approximatis, vexillo tenuiter sericeo suborbiculato leviter emarginato, basi bicalloso; ovarium tenuiter sericeum, ovulis 3.—Evidently pertains to the *Neuroscaphi* or *Densiflori* of Bentham's treatment, Journ. Linn. Soc. Bot. 4: Suppl. 85–101. 1860, to none of which it seems possible to refer it, considering the fineness with which specific lines must with present knowledge be drawn. The specimen was distributed as *L. confertiflorus*(?) which it simulates but that glabrous species has pellucid punctate leaves, smooth banner. Type from a tree 28 meters tall, flowers greenish white.

San Martín: Chazuta, *Klug 4041*, type.

Derris spiciflora (Mart.) Macbr., comb. nov. *Lonchocarpus spiciflorus* Mart. ex Benth. Journ. Linn. Soc. Bot. 4: Suppl. 91. 1860.

Branchlets soon glabrous; leaflets 7–9, oblong-elliptic or somewhat obovate, rounded or retuse at apex or minutely acuminate, often 10–15 cm. long, 5–7 cm. wide, subcoriaceous, glabrous and slightly lustrous above, sometimes most minutely reddish puberulent

beneath, the divergent lateral nerves impressed above, prominent beneath; racemes dense, floriferous nearly to base, solitary or often fasciculate, 10 cm. long or longer; pedicels finally 2 mm. long, the flowers at anthesis subsessile and scarcely 10 mm. long; bractlets suborbicular; calyx truncate; banner glabrous, transversely bicalloused-orbiculate; ovary finely sericeous, ovules about 4, style glabrous; pods 7.5 cm. long, 18 mm. wide, probably larger, glabrous. —According to Mexia bark used in strips for lashings, that collector's specimen from an 8-meter tree with slightly fragrant white flowers. Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 101.*

Loreto: Overflowed bank, *Mexia 6452a.* Balsapuerto, *Klug 2991.* —San Martín: Chazuta, *Klug 4121; 3967.* Brazil. "Yumanaza."

Derris sylvestris (A. C. Smith) Macbr., comb. nov. *Lonchocarpus sylvestris* A. C. Smith, Amer. Journ. Bot. 24: 576. 1937.

Vigorous liana, essentially glabrous (and appearing so to the eye) except for a minute appressed pilosity on the leaflets beneath and the petals without; petioles 7–13 cm. long, the slender petiolules 4–10 mm. long; leaflets 5–9, chartaceous, lustrous above, oblong to elliptic, usually 12–23 cm. long, 4.5 (9) cm. broad, commonly obtuse or rounded at base, gradually acuminate, the acumen 1–3 cm. long; inflorescence to 7 dm. long, the peduncles usually 6–9 mm. long, the pedicels 4–7 mm. long; calyx cupuliform, 6–7 mm. long, 4–5 mm. broad, brown sericeous both sides, the deltoid acute lobes about 2 mm. long; banner 12 mm. broad, nearly as long, conspicuously retuse, the wings often strongly falcate; ovary minutely golden sericeous, the ovules 2–4.—Roots, according to the author, exude little (and this watery) latex when cut, their wood whitish or yellowish, the bark conspicuously ridged when dry. Roots noted as long as 20 meters growing only a few inches below the surface. *L. floribundus* Benth., 284, is similarly pubescent except that the banner is sericeous without; the wings are nearly straight, the leaflets coriaceous, 2.5–5 cm. wide.

Junín: *Killip & Smith 26494; 26501; 26527; 26560.*—Loreto: Wooded bank of Río Marañón, near mouth of Río Tigre, *Killip & Smith 27528,* type, also *26841; 27092,* and other collections.— Río Acre: Basin Río Purus, *Ule 9460.* Amazonian Brazil.

Derris urucu (Killip & Smith) Macbr., comb. nov. *Lonchocarpus urucu* Killip & Smith, Journ. Wash. Acad. Sci. 20: 81. *pl. 4.* 1930.

An erect shrub becoming a great liana, attaining even the treetops; petioles 7–15 cm. long, with the petiolules (4–9 mm. long)

and the leaflets beneath spreading pilose, the trichomes more or less golden; leaflets 7 (5–9), thin coriaceous, dark green and lustrous above, dull beneath, obovate-oblong, especially the terminal one, 10–31 cm. long, 6–16 cm. wide, rounded or obtuse at base, abruptly acuminate, the upper surface including the midnerve glabrous; lateral nerves 7–12, prominent beneath; inflorescence 1–2 dm. long, reddish silky tomentose, the peduncles often 4–6 mm. long, the slender pedicels about 3 mm. long; calyx cylindric campanulate 4–5 mm. long, nearly as broad, the subacute lobes about 2 mm. long; petals reddish violet, silky without, the suborbicular banner 12 mm. broad, nearly as long, retuse, the wings nearly straight; ovary minutely sericeous, the ovules 4; pods broadly ovate to oblong-ovate, 4–9 cm. long, 2.5–3 cm. broad, rounded or subacute at apex, more or less acute at base, strongly compressed, minutely sericeous, 1 (2) -seeded.—Latex of fresh roots when cut thick, abundant, the wood in the central part blood-red after short exposure, the bark drying smooth; roots are said to attain 25 meters, resembling garden hose. According to Krukoff & Smith, l.c. 582 (whose description is modified), the bulk of roots and powder exported from the Amazon is of this species. The authors of the species noted that the native name "timbo urucú" refers to the reddish color, the first word being a name for any fish poison. Illustrated, Krukoff & Smith, l.c. 576 (fr.).

Peru: Undoubtedly, as already collected near the boundary with Brazil. Amazonian Brazil. "Timbo urucú," "timbo uassú."

13. PLATYMISCIUM Vog.

Trees or shrubs with characters in general those of *Derris* but the leaves opposite or 3–4-verticillate, the wings of the yellowish or yellow and violet flowers free, the staminal tube cleft above (the vexillar stamen rarely free) and especially the venose pods with a thin wing-like margin about the large solitary seed, the wings more extended at each end, the pod thus oblongish.

Hymenolobium Benth., to be expected in eastern Peru, is similar but the pods are often more membranous, ovules several, keel petals free, and leaves alternate. The species of *Platymiscium*, Bentham has written (1860), "are very difficult to characterize . . . . Several of the forms described as species may possibly, when better known, have hereafter to be united." These remarks are certainly true to this day and the identity of much of the material, mostly in flower, is open to question.

An important timber tree of the Amazon, called "macacaúba," is *P. trinitatis* Benth., l.c., especially the variety *nigrum* Ducke, fide Amsh. (*P. Duckei* Huber); it has lightly to densely sericeous calyces, fruiting pedicels 4–6 mm. long.

Calyces 2–2.5 mm. long; flowers borne with mature leaves. *P. gracile.*
Calyces 3–4 mm. long; flowers borne before leaves or these young. *P. stipulare.*

Platymiscium gracile Benth. Journ. Linn. Soc. Bot. 4: Suppl. 82. 1860.

Bark of branchlets gray, rather densely verticillate; stipules lanceolate, 1–1.5 cm. long, flowering branchlets glabrous as also the leaves and racemes or the rachis and pedicels minutely and very sparsely puberulent; leaflets 5, firm-membranous, lustrous, finely reticulate-veined, minutely acuminate, rarely acute at base, oval-obovate, about 5 (7) cm. long, 3 (4) cm. wide, on petiolules 5–8 mm. long; racemes solitary or 2–3, slender, 1–1.5 dm. long; pedicels 2–2.5 mm. long, scarcely exceeding the calyx; flowers 6 mm. long, the obovate banner barely longer than the wings; pods 5 cm. long, 2 cm. wide at the middle, narrowed both ends, the stipe 3.5 mm. long.—F.M. Negs. 18403; 21907.

San Martín: Tarapoto, *Spruce 4228*, type.

Platymiscium stipulare Benth. Journ. Linn. Soc. Bot. 4: Suppl. 82. 1860.

Branchlets somewhat inflated; stipules lanceolate, glabrous, to 2 cm. long; leaflets 5, oval, shortly acuminate, rounded at base, glabrate, becoming coriaceous and prominently reticulate-veined, to 12 cm. long, half as wide; racemes densely floriferous nearly to base, sometimes elongated to a dm. long or longer, the rachis and pedicels (these at anthesis 2–2.5 mm. long, little longer in fruit) densely tomentulose-pilose; bracts and bractlets caducous, the former ovate, membranous, nearly 6 mm. long, the latter about half as long; calyx puberulent or glabrous, about 3 mm. long; flowers 12 mm. long; claw of banner as long as calyx; stamens monadelphous; pods 7 cm. long, 3.5 cm. wide, the stipules about 1 cm. long. —The hollow part of the young branchlets is always full of ants (Bentham); flowers yellow and violet (Klug). *P. pinnatum* (Jacq.) Dugand, widely distributed from just north of Peru, has more open racemes, the pedicels 8–12 mm. long. *Klug 3832* has granular puberulent calyces, pubescent rachis, larger flowers than type;

Klug 2980 has glabrous calyx; both collections perhaps should be included in *P. trinitatis* Benth. F.M. Negs. 21909; 28273.

San Martín: Tarapoto, *Spruce 4292*, type. Juanjuí, *Klug 3832*. San Antonio, *Belshaw 3519*.—Loreto: Balsapuerto, 6-meter tree with large flowers, *Klug 2980*(?).

14. PLATYPODIUM Vog.

Trees, the leaves either abruptly or imparipinnate, their leaflets alternate or irregularly opposite, the flowers showy, yellow, laxly racemose in the upper axils, and, strikingly in mature fruit, the pods samaroid but the seed apical, the wing-portion narrowing to the stiped base. Bracts and bractlets small, caducous. Calyx turbinate at base, the 2 upper lobes more or less connate. Banner unappendaged; keel petals connate. Stamens connate into 2 groups except the vexillar and lowest one free; anthers versatile. Ovary many-ovuled, the filiform style with small terminal stigma. Seeds solitary (rarely 2), oblong-reniform with short inflexed radicle.

The fruit suggests that of *Schizolobium*.

Platypodium viride Vog. Linnaea 11: 420. 1837; 262. *P. elegans* Vog. var. *major* Benth. in Mart. Fl. Bras. 15, pt. 1: 262. 1862.

Younger parts puberulent; petioles several cm. long; leaflets 5–10 pairs, oblong-elliptic, acute at base, more or less retuse, coriaceous, veiny, lustrous above, glabrous beneath in age, commonly 5 cm. long, nearly half as wide; racemes 5–10 cm. long, shorter than the leaves; pedicels 6–8 mm. long; calyx about 5 mm. long, glabrous or nearly; banner to 2 cm. broad; pods glabrous, lustrous, scarcely venose, oblanceolate, little narrowed to the stipe, 10–11 cm. long, 3 cm. wide at the seed.—*P. elegans* Vog. has leaflets to 2.5 cm. long, 1 cm. wide, the veiny pods only half as large as those of *P. viride* and more abruptly attenuate to stipe; there may be intermediate forms, in which case Bentham's disposition of *P. viride* would be the more natural one. To 25 meters high.

Río Acre: Terra firma, Río Macauhán, *Krukoff 5709*. Brazil.

15. POECILANTHE Benth.

With the appearance of the related *Pterocarpus* and mostly with the same characters but the calyx semi-4-toothed, the upper tooth connate into one that is merely shortly dentate, the keel incurved and shorter than the wings, these auricled in the Peruvian species,

the 5 alternate longer anthers affixed near the base, the remaining versatile. Pods compressed, woody, dehiscent.

Poecilanthe effusa (Huber) Ducke, Bull. Mus. Paris, sér. 2. 4: 733. 1932. *Amphiodon effusus* Huber, Bol. Mus. Goeldi 5: 399. 1908.

Leaflets glabrous, lustrous both sides, chartaceous, reticulate-veiny, acute at base, acuminate or shortly caudate-acuminate, ovate-oblong, 7–14 cm. long, 3.5–6 cm. wide; racemes minutely ashy puberulent-pilose, 3–6 cm. long; flowers purplish, subsessile, 7–9 mm. long; calyx about 4.5–6 mm. long, deeply lobed, the obtusish divisions oblong; stamens nearly diadelphous; ovary subsessile, glabrate; pods obovoid, shortly stiped, 3–4 cm. long, 2 cm. wide with 1–2 chestnut-colored seeds 2 cm. long.—*P. amazonica* Ducke, l.c. 734, has most of the leaves 1-foliate, the pods to 7 cm. long, long-stiped. Wood used for construction; to 20 meters high (Krukoff). Illustrated, Archiv. Jard. Bot. Rio Jan. 6: *pl. 2.*

Río Acre: On terra firma near "Caripe," mouth of Río Macauhán, *Krukoff 5605.* Brazil.

16. PTEROCARPUS L.

Reference: Ducke, Archiv. Jard. Bot. Rio Jan. 4: 82–86. 1925.

Unarmed trees with alternate oddly pinnate leaves (the leaflets alternate or irregularly opposite and estipulate) and yellow or white and violet, glabrous, often showy flowers borne in axillary simple racemes or lax axillary and terminal panicles. Bracts and bractlets small, caducous. Calyces campanulate, usually acutish at base, incurved in bud, the 2 upper lobes more or less connate. Stamens all high-connate, the tube cleft above or both sides equally or the vexillar stamen free; anthers versatile. Ovary sessile or stiped, 2–6-ovuled. Pods compressed, indehiscent, orbicular or ovate to oval-oblong, thin or thick, sometimes winged all around, the style usually lateral, the seed medial. Seeds 1, or 2 and then indurately separated.

The segregate *Vataireopsis* Ducke has a turbinate calyx, stamens slightly connate, the ovary with 2 lateral crests; *Vatairea* Aubl. has straight calyx. These differences are comparable to the segregation of *Diplotropis.* One Brazilian species, *P. ormosioides* Ducke, is unique in having calyces that are obtuse at base and dark violet flowers and has been placed probably rightly by Ducke in a distinct genus, *Paramachaerium* Ducke; cf. Trop. Woods 41: 6–7. 1935.

Leaflets shortly pilose beneath; pedicels to 8 mm. long. *P. rufescens.*

Leaflets glabrous; pedicels 1–4 (5) mm. long.

Pedicels 1–2 (3.5) mm. long; bracts and bractlets caducous; pods flat.

Rachis slender; pods thin-winged all around..... *P. Rohrii.*

Rachis fleshy-inflated, spindle-shaped; pods thin-margined. *P. Ulei.*

Pedicels about 4 mm. long; pods thick, oblong-pyramidal; bracts 6–7 mm. long, subpersisting..... *P. amazonum.*

Pterocarpus amazonum (Mart.) Amsh. Med. Bot. Rijks Herb. Utrecht 52: 56. 1939; 267. *Phellocarpus amazonum* Mart. ex Benth. Ann. Naturh. Hofmus. Wien 2: 106. 1838.

Glabrous except the long (–1.5 dm.) spike-like racemes, these finely rusty pubescent, the rachis, at least as to type, fleshy-inflated, 6–8 mm. in diameter; leaflets 7–9, oval or oblong-elliptic, obtusely acuminate, 5–7.5 cm. long (probably often longer); pedicels about 4 mm. long, incurved spreading; lance-subulate-acuminate bracts and subulate bractlets deciduous, the former scarcely shorter than the silky pubescent calyx, this about 8 mm. long, the truncate upper lip very shortly bifid; corolla twice as long as the calyx, ochroleucous; pods 5–10 cm. long, suberose, oblong-pyramidal, 5-winged and 5 costate.—The following collection is in flower and suggests also *P. santalinoides* L'Hér. (*P. amazonicus* Huber, Bol. Mus. Goeldi 5: 402. 1909?) and is referred here with some doubt; the upper stems are hollow and appear to be inflated but the rachi of the young racemes are only slightly if at all enlarged; the bracts are not promptly caducous as in *P. Ulei;* the leaves are broadly ovate, the larger 11 cm. long, 7 cm. wide; a tree of 16 meters with trunk 1 meter in circumference, the wood soft, the flowers yellow, the fruit brown (not seen).

Loreto: Salinas trail, rising ground, Rio Mazán, *José Schunke 304* (distr. as *P. Rohrii*). Brazil. "Mututí."

Pterocarpus Rohrii Vahl, Symb. Bot. 2: 79. 1791; 267.

Leaflets rather to very lustrous, typically glabrous and densely reticulate-veined both sides, 5–9, ovate or oblong, rounded at base, acute or shortly acuminate, 5–8 cm. long, 3–4 cm. broad, or usually some considerably smaller and longer racemes (as often the branchlet tips and petioles) rusty tomentulose, mostly 3–8 cm. long,

sometimes much longer and branched; bracts shorter than the flower buds, about 2 mm. long; pedicels 2–2.5 mm. long; flowers yellow, fragrant; calyx 7–10 mm. long, slightly incurved, twice exceeded by the orbicular standard; ovary sessile, densely tomentose, 3–6-ovuled, the suborbicular veiny pod to about 7 cm. wide, broadly membranous wing-margined and with 1 seed.—*P. officinalis* Jacq. of northern South America and north has stiped ovary, glabrous as also the inflorescence. *P. santalinoides* L'Hér., Amazonian and African in distribution, has pods winged only on the outer side, the bracts longer than the flower buds, the pedicels 2–4 mm. long. It attains 30 meters (Krukoff), grows in secondary forest, not inundated (Ducke). Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 92.*

Loreto: Middle Ucayali, *Tessmann 3204* (det. Harms).—Río Acre: Río Macauhán, on terra firma, *Krukoff 5474.* Brazil to Guiana and Trinidad.

Pterocarpus rufescens Benth. Journ. Linn. Soc. Bot. 4: Suppl. 79. 1860.

Well marked by the long pedicels and the fine rusty puberulence or pilosity that extends in some degree even to the mature pods, only the upper surface of the leaflets glabrous; leaflets 7–9, elliptic-oblong, membranous, reticulate-veined both sides, shortly acute or acuminate, rounded at base, 5 cm. long, 2 cm. wide or larger; racemes simple, lax, the pedicels about 8 cm. long, slightly longer than the calyx; banner 15 mm. long; stamens monadelphous; ovary sessile, tomentose; pods, except for the puberulence, similar to those of *P. Rohrii.*—*P. violaceus* Vog. of Bolivia and Brazil has similarly elongate pedicels, but glabrous leaves, firm fruit-wings; in pubescence the resemblance to *P. Zehntneri* Harms and *P. villosus* Mart., Brazilian species, is great but both have much shorter pedicels. More puzzling are forms of *P. Rohrii* from Ecuador that approach *P. rufescens* in pubescence but this finer, sparser, and the pedicels are short; they probably represent another species rather than an intermediate form. F.M. Neg. 21910.

San Martín: Tarapoto, *Spruce 4471,* type. Venezuela.

Pterocarpus Ulei Harms, Verh. Bot. Ver. Brandenb. 48: 171. 1907. *P. ancylocalyx* var. *angustifolius* Benth. in Mart. Fl. Bras. 15, pt. 1: 269. 1862.

Tree with the striking inflated rachis of *P. amazonum* but the promptly caducous bracts and bractlets somewhat shorter, the

pedicels 1.5–2 (3) mm. long; leaflets 6–10 cm. long, 2.5–3 (5) cm. wide; calyx 6–7 (10) mm. long; banner 15 mm. long; ovary oblong-linear, densely sericeous, with 5–6 ovules; pods glabrous, sessile, thinly attenuated only around the outer margin, nervose, obliquely oval, 5 cm. long, 4 cm. broad.—The crowded almost subsessile flowers give this specimen an aspect very different from that of the one referred in this work to *P. amazonum*. As Harms has remarked, the taxonomic significance of the inflated rachi (inhabited by ants) remains to be shown; Bentham, in Mart. Fl. Bras. l.c., treated *P. amazonum* as a variety? (vel status monstruosus) of *P. Rohrii*. The determinations except as noted are by Harms. According to Ducke the Harms species is in fact *P. amazonum;* nevertheless he uses the name of Harms! He follows Amshoff with some misgivings in associating *P. santalinoides* L'Hér. with *P. amazonicus* Huber, Bol. Mus. Goeldi 5: 402. 1909. Klug recorded the flowers as golden-yellow; to 15 meters high, nearly 10 dm. around, good timber, fruit black (Schunke); a short or tall tree (Williams). F.M. Negs. 2296; 6286; 28280.

San Martín: Pongo de Cainarachi, *Klug 2705* (det. Standl.).—Loreto: La Victoria, *Williams 3100; 2821*. Pebas, *Williams 1853*. Río Mazán, *J. Schunke 190* (det. Killip). Vicinity of Iquitos, *Tessmann 5540; Klug 1474; 1225*. Brazil. "Mariabuena," "jaguar caspi."

17. VATAIREA Aubl.

Trees, usually more or less leafless in flower and fruit, with the character and aspect of *Pterocarpus* but the calyx straight, shortly and regularly 5-dentate, the heartwood yellow with brown streaks. Pods with a prominent transversely striate terminal wing formed by the persisting style, or orbicular, corky and with a rudimentary wing, the seeds solitary.

The segregation of *Pterocarpus* accords with that of *Diplotropis* in calyx-character and in both cases the expediency may be questioned unless the character is supported by fruiting differences, which does not appear to be the case. Ducke, Archiv. Jard. Bot. Rio Jan. 5: 135, 1930, excludes (from *Vatairea*) *Tipuana* Benth., the calyx subbilabiate, the vexillar stamen free, the wood white, and, l.c. 6: 35. 1933, proposes of necessity yet another name, *Vataireopsis* Ducke (*V. speciosa* Ducke, l.c. 36, Amazonian) for a similar tree with subbilabiate but incurved calyx, the stamens all united and scarcely for one-fourth their length.

Vatairea fusca Ducke, Archiv. Jard. Bot. Rio Jan. 5: 192. 1930. *Tipuana fusca* Ducke, l.c. 78. 1925.

Branchlets and inflorescence dark-brown-tomentose; leaf-rachis distinctly grooved and margined bearing 13–17 shortly petiolulate leaflets, the lateral oblong to oblong-elliptic, obtuse or acutish at both ends, 3–7 cm. long, nearly 2 to 2.5 cm. broad, the terminal obovate, acute at base, to 3 cm. broad, all minutely and sparsely strigillose beneath, closely reticulate both sides; racemes terminal, often more than 3 dm. long, floriferous above the middle, the velvety calyces 5–7 mm. long on pedicels nearly as long; petals pale violet, 12–15 mm. long; ovary shortly stiped, ashy pubescent.—Tree attaining 30 meters, the inner wood yellow densely streaked with brown.

Río Acre: On terra firma, mouth Río Macauhán, *Krukoff 5465; 4342*. Brazil.

18. MACHAERIUM Pers.

Drepanocarpus Mey.

Reference: Benth. Journ. Linn. Soc. Bot. 4: Suppl. 52–71. 1860.

Shrubs or trees or high-climbing lianas with oddly pinnate leaves, the usually alternate leaflets estipulate, the stipules sometimes spinescent. Flowers small or medium, purple, white or red, in short often secundly flowered racemes fasciculated in the axils or crowded in terminal panicles, the pedicels short or obsolete. Bracts small, caducous, the bractlets more or less persisting beneath the commonly truncate shortly toothed calyx. Banner broad, unappendaged, often silky pubescent without, the usually falcate wings oblong, the keel incurved, the petals connate dorsally. Stamens various as in *Dalbergia* but the anthers versatile, with longitudinally dehiscent parallel cells. Ovary often stiped, characteristically 1-ovuled, the filiform style incurved. Pods indehiscent, compressed, more or less extended into a reticulate-veiny wing or merely margined or curved, the solitary seed ovate, orbicular or reniform with inflexed radicle.

Ducke, Archiv. Jard. Bot. Rio Jan. 3: 151. 1922, and 5: *pl. 11* (fruits), has shown the natural unity of *Drepanocarpus* with *Machaerium*, as had been indicated by Bentham; the genus in turn, in such species as *M. inundatum* (Mart.) Ducke, merges with *Dalbergia*, both groups furnishing the rosewood of commerce, and, except for the convenience of following tradition, could be classified under one group name since the anther dehiscence is equally variable in other natural genera, as in *Cassia*, for instance.

Leaflets rounded apically or retuse, often mucronate, if a little narrowed at tip, this obtuse or merely acutish, except *M. longistipitatum* all or mostly narrower than 2 cm.

Leaflets about one-third as wide as long.

Leaflets 25–61; flowers except banner glabrous.

Leaflets 4–8 (10) mm. wide.

Leaflets mostly 2 cm. long or shorter, glabrate at least beneath ..... *M. aculeatum.*

Leaflets mostly 2.5 cm. long or somewhat longer, pilose both sides ..... *M. longifolium.*

Leaflets 11 (10) –15 mm. wide ..... *M. Bangii.*

Leaflets 11–15 or fewer or if more (25) flowers densely hirsute.

Flowers 8–11 mm. long; leaflets rounded at base, minutely puberulent.

Flowers except banner glabrous; leaflets 5–11 *M. lunatum.*

Flowers hirsute; leaflets 15–25 ..... *M. tortipes.*

Flowers 6 mm. long; leaflets acute at base, densely appressed-pilose beneath ..... *M. complanatum.*

Leaflets nearly or quite half as broad as long, 11–23.

Leaflets small, retuse or aristate.

Leaflets retuse, minutely mucronulate ..... *M. Schunkei.*

Leaflets prominently mucronate ..... *M. aristulatum.*

Leaflets to several cm. long, rounded or barely acutish. *M. longistipitatum.*

Leaflets obviously acuminate or acute, sometimes shortly except *M. iquitosense* (cf. *M. longistipitatum, M. complanatum,* leaflets barely acutish); all or mostly wider than 2 cm. except *M. campylothyrsum.*

Primary nerves prominent; flowers in long usually terminal panicles, not secund.

Leaflets at least shortly acuminate.

Bractlets caducous or inconspicuous.

Leaflets broadly elliptic; pods 18–24 mm. wide at seed, wings 2.5 cm. wide or wider ..... *M. floribundum.*

Leaflets about oblong; pods 1 cm. wide at seed, wings to 2.5 cm. wide ..... *M. decorticans.*

Bractlets nearly half as long as calyx, persisting. *M. cuspidatum.*

Leaflets rounded at tip.....*M. iquitosense.*

Primary nerves obscure or anastomosing; flowers more or less secund, the inflorescence if terminal or a panicle, short, except *M. Kegelii.*

Bractlets caducous or inconspicuous.

Inflorescence terminal; leaflets 2–3 cm. wide, 9–13.
M. leiophyllum.

Inflorescence axillary in part or entirely and short if the leaflets are only 2–3 cm. wide.

Inflorescence recurved, densely rusty tomentose.
M. campylothyrsum.

Inflorescence ascending or not recurved, glabrate to rusty pilose.

Leaflets 13–17, 2–3 cm. wide.....*M. amazonense.*

Leaflets 5–7, often 4–5 cm. wide.

Pods glabrous at maturity; stamens monadelphous.
M. lanceolatum.

Pods sparsely pilose even at maturity; stamens diadelphous.....*M. peruvianum.*

Bractlets conspicuous, concealing the calyx.....*M. Kegelii.*

Machaerium aculeatum (DC.) Raddi, Mem. Soc. Moden. 18: 598. 1820; 19. *Nissolia aculeatum* DC. Prodr. 2: 258. 1825. *M. isadelphum* (E. Mey.) Amsh. Med. Bot. Rijks Herb. Utrecht 52: 53. 1939. *Drepanocarpus isadelphus* E. Mey. Nov. Act. Acad. Leop.-Carol. 12: 807. 1824. *M. angustifolium* Vog. Linnaea 11: 193. 1837?

Short or small tree with stipules spinescent in age, the leaves with many (–60) linear-oblong, glabrous or slightly pilose rather firm leaflets, 10–15 mm. long, 2–5 mm. wide, rounded or retuse at tip, their lateral nerves many and approximate; panicles terminal, often on small branchlets, rusty pubescent; bractlets 1–2 mm. long as also the pedicels, the 5-toothed calyx about twice as long, glabrous or nearly; standard short, 8 mm. long, lightly pubescent without, the keel strongly curved; stamens nearly isadelphous; ovary villous, the style glabrous except at base, 3 mm. long; pod sparsely pilose or glabrate, about 5 cm. long, 5 mm. wide at the seed, the thin reticulate wing 8 mm. wide.—Malme, Bihang Svensk. Vet. Akad. Handl. 25, Afd. 3. no. 11: 18, maintained that it is easy to distinguish *M. angustifolium* by the fruit, the seed part of the pod

being densely ashy-pubescent, 7 mm. wide, wing to 12 mm., this sparsely pubescent, rounded and mucronate apically, the mucro dorsal-apical, while the fruit of *M. aculeatum* has seed portion densely rusty-pubescent, strongly curved, 12 mm. wide, wing to 18 mm. wide, sparsely tomentose or puberulent, the apex rounded, not all mucronate. According to Hoehne these characteristics are inconsequential and I have not seen enough fruiting material to express an opinion.

San Martín: Tarapoto, (*Spruce 4556*, det. Benth.). Tabalosus, east of town, *Belshaw 3368* (probably, no leaves).—Loreto: Mishuyacu, *Klug 1307* (det. Hoehne, *M. longifolium*). To Paraguay, Panama and the Guianas.

Machaerium amazonense Hoehne, Arq. Bot. Est. S. Paulo n. sér. 1: 46. *pl. 56*. 1939.

Vigorous unarmed liana, the younger branches appressed rusty-pubescent; leaflets 13–17, mostly nearly opposite, oblong-elliptic, rounded or slightly cordate at base, rather abruptly acuminate, the tip itself obtuse or mucronulate, the middle ones 5–7 cm. long, 2–3 cm. wide, rather abundantly, as the rachis, rusty-pubescent beneath; inflorescence axillary and terminal with recurving branches; bracts caducous, the small orbicular bractlets appressed to calyx, this campanulate, 4–5 mm. long, the triangular teeth scarcely acute; banner 7–8 mm. long, 5–6 mm. wide, like the calyx and petals rusty-pubescent; stamens diadelphous; ovary well stiped, pubescent, the style glabrous.—Cf. *M. latifolium* Rusby, Bull. N. Y. Bot. Gard. 6: 513. 1910. Illustrated, Hoehne, Fl. Bras. 25, pt. 3: *pl. 67*.

Loreto: Puerto Arturo, *Killip & Smith 27833*. Brazil.

Machaerium aristulatum (Spruce) Ducke, Archiv. Jard. Bot. Rio Jan. 4: 311. 1925. *Drepanocarpus aristulatus* Spruce ex Benth. in Mart. Fl. Bras. 15, pt. 1: 256. 1862.

Liana, the stipules indurating, becoming recurved spines; leaflets 11–15, oblong, rounded both ends, conspicuously aristate at tip, mostly 4–5 cm. long, 10–18 mm. broad, coriaceous, glabrous and lustrous above, early minutely puberulent beneath, the numerous veins approximate and nearly parallel; panicles laxly branched, ample, somewhat silky pubescent with ashy or fulvous trichomes; flowers subsessile, 8–10 mm. long; bractlets elliptic-oblong; calyx truncate, 5 mm. long; banner reflexing, 7 mm. long, ashy-sericeous without, the strongly falcate wings less so; stamens monadelphous;

ovary stiped, villous.—Illustrated, Hoehne, Fl. Bras. 25, pt. 3: *pl. 8*. F.M. Neg. 6285.

Loreto: Iquitos, *Ducke 7548* (det. Hoehne). Río Itaya, *Killip & Smith 29544* (det. Killip). Brazil.

Machaerium Bangii Rusby, Bull. N. Y. Bot. Gard. 4: 347. 1907.

Liana or probably at first a shrub, the younger branchlets, leaf rachi and long inflorescences rusty-villous; stipules spinescent, sometimes 6 mm. long; leaflets 25–31, alternate, oblong, rounded at base, emarginate, obscurely or not at all mucronulate, all except the lowest 3.5–4.5 cm. long, 1–1.5 cm. broad, membranous, lightly subappressed pilose both sides, the veins obscure; pedicels about 2 mm. long; calyx 5 mm. long, nearly as broad, the short lobes obtuse, lightly appressed pilose; flowers dark purple, the banner moderately sericeous without, 9 mm. long, the petals glabrous; stamens equally diadelphous; ovary pilose, long-stiped.—The stems become glabrous, the bark reddish-brown and lustrous in the type. According to Bang, the Indians sometimes used the leaves instead of Coca.

San Martín: Tarapoto, *Ule 6357* (det. Harms). Bolivia.

Machaerium campylothyrsum Hoehne, Arq. Bot. Est. S. Paulo, n. sér. 1: 47. *pl. 57*. 1939.

Apparently very similar to *M. amazonense* but with only 5–7 (or sometimes 9–15) leaflets, and with rusty or reddish tomentose axillary strongly recurved panicles; leaflets 2–3 (4) cm. long, 1.5–2 cm. broad, glabrous or nearly except for the midnerve; stamens monadelphous; ovary subsessile.—The Peruvian collection is var. *crebrifoliolatum* Hoehne, l.c., with more numerous (9–15) smaller leaflets. It may prove to be the same as *M. castaneiflorum* Ducke, Archiv. Jard. Bot. Rio Jan. 2: 148. 1922. Illustrated, Hoehne, Fl. Bras. 25, pt. 3: *pl. 66*.

Loreto: Iquitos, (*Ducke*). Brazil.

Machaerium complanatum Ducke, Archiv. Inst. Biol. Veg. Rio Jan. 2: 46. 1935.

High climbing, the stem complanate, the younger branchlets densely reddish-villous; stipules commonly fragile and caducous, very rarely persisting as recurved spines; leaflets usually 11–15, subsessile, oblong-subobovate, very variable in size, the larger to 6 cm. long, to 2 cm. broad, often half as large, cuneately acute

at base, obtuse or acutish, subcoriaceous, glabrous, glaucescent above, the secondary nerves impressed, the veinlets obscure, densely lustrous rufescent beneath with a closely appressed pilosity; panicles terminal and in the upper axils, closely reddish-villous, even to 1 meter long; bracts and bractlets caducous at anthesis; flowers white, sessile or nearly, the calyx 1.5–2 mm. long, campanulate, fulvous tomentose, minutely dentate; banner sericeous without, 6 mm. long, equaled by the wings; stamens monadelphous; ovary stiped, yellowish hirsute.—Hoehne, 42, reduces this to *M. parviflorum* Benth. in Mart. Fl. Bras. 15, pt. 1: 242. 1862, having seen a photograph of the type; ex char. there is no doubt that Ducke's liana is distinct from the shrub of Matto Grosso with 17–31 acute or obtusish minutely puberulent leaflets, 12–18 mm. long, obtuse at base, and glabrous flowers 4–5 mm. long. The type locality of *M. complanatum* is Tabatinga, at the border of Peru in non-inundated woods. Illustrated, Hoehne, Fl. Bras. 25, pt. 3: *pl. 29* (as *M. parviflorum*).

Peru (no doubt). Brazil.

Machaerium cuspidatum Kuhlm. & Hoehne, Arq. Bot. Est. S. Paulo, n. sér. 1: 31. *pl. 32.* 1938.

Robust high-climbing liana, apparently unarmed; stipules prominent, broadly ovate, striate; leaflets usually 5, broadly elliptic or oblong-obovate, slightly narrowed to the rounded base, shortly and abruptly acuminate, prominently nerved and reticulate-veined, glabrous and lustrous above, grayish beneath with an almost microscopic indument, 8–14 cm. long, 4.5–8 cm. wide, the petiolules 4–6 mm. long; panicles short, dense, the bractlets conspicuously persisting; calyx nearly truncate, 4–5 mm. long, finely striate; flowers sessile, 10–12 mm. long, the banner densely appressed, strigose; stamens monadelphous; pods nearly oblong, only slightly broader at base, densely sericeous tomentose, 8 cm. long, 1.5 cm. wide (immature).—The Mexia specimen was distributed by Standley under an unpublished name, this after the collector. Illustrated, Hoehne, Fl. Bras. 25, pt. 3: *pl. 60.*

Loreto: Overflowed river bank near Mazán, *Mexia 6456.* Mouth of Río Apaga, *Tessmann 4891.* Yurimaguas, (*Kuhlmann 1431*, type).

Machaerium decorticans Ducke, Archiv. Jard. Bot. Rio Jan. 2: 150. 1922; 44.

Similar to *M. floribundum;* leaflets 9–13, almost oblong, acute or gradually acuminate, to 13 cm. long, 5 cm. broad, often smaller,

especially shorter, subcoriaceous; panicles sometimes 5 dm. long; petals white with violet spots, the banner about 7 mm. long, more or less ashy-sericeous; pods shortly stiped, 5–7 cm. long, nearly straight, 1 cm. broad below, the membranous wing scarcely 1.5 cm. broad.—The author himself, l.c. 4: 77. 1925, refers this plant to *M. floribundum* (which action Amshoff has followed), but Hoehne has indicated there is at least an apparent difference in the pods; until sufficient material accumulates to show the range of variation, therefore, it seems wiser to retain Ducke's name. Possibly the variety of *M. floribundum*, known only in flower, is the same as Hoehne suggests, but fruiting material from the same locality must be had to determine this. F.M. Neg. 18301.

Loreto: Iquitos, (*Ducke 7499*); *Klug 2808* (fide Hoehne). Brazil. Bolivia? Colombia?

Machaerium floribundum Benth. Journ. Linn. Soc. Bot. 4: Suppl. 68. 1860; 68.

Liana with spinescent stipules and 7–9 foliate leaves, the leaflets broadly oblong-elliptic or often obovate, mostly 8–10 cm. long, 3.5–5 cm. wide, abruptly and shortly acuminate, subcoriaceous, glabrous or minutely puberulent beneath where the parallel lateral veins are prominent even to the margin; panicles ample, terminal, many-flowered, the bracts caducous, the bractlets suborbicular, much shorter than the calyx; pedicels obsolete or nearly; flowers (5.5) 8 mm. long, glabrous, the calyx rusty-red tomentose; stamens monadelphous; pods glabrous or nearly, to 10 cm. long, 18–24 mm. wide at the seed, the wing at the middle 2.5–3 cm. wide, the stipe sometimes nearly 12 mm. long.—Var. *parviflorum* Benth. has flowers scarcely 6 mm. long, the leaflets to 16 cm. long, 7 cm. wide, chartaceous. Cf. *M. decorticans* Ducke. The type of *M. floribundum* is *Spruce*, near Santarem the "*M. macrophyllum* Benth. not Mart." and not *Burchell* as indicated by Hoehne. *West 8006*, with flowers before leaves, reddish pilose, spinescent stipules 3–5 mm. long, leaflets many, glabrous or scarcely pubescent beneath, 8.5 cm. long, 3.5 cm. wide, is apparently not clearly either *M. floribundum* or *M. Bangii*, but probably should be included in the latter.

San Martín: Tarapoto, *Spruce 4544* (the var.); on trail to San Antonio, *Belshaw 3457?*

Machaerium iquitosense Macbr., spec. nov.

Frutex scandens; stipulis indurato-spinescentibus 3 mm. longis; ramulis glabris; foliolis 5–7 paullo obovatis vel rare oblongo-ellipticis

basi late cuneato-obtusis vel rotundatis, apice late rotundatis minutissime apiculatis haud acutis ad 12 cm. longis, 6 cm. latis, coriaceis haud nitidulis supra glabris, subtus minutissime puberulis dissite penniveniis, venis parum conspicuis; paniculis fasciculato-ramosis circa 12 cm. longis breviter ferrugineo-pilosis; floribus albis subsessilibus vix 6 mm. longis, calycis fere 3 mm. longis laciniis rotundatis; bracteolis orbiculatis vexillo sericeo; staminibus monadelphis.—Noted by the collector as a tree 2.5 meters high but certainly scandent, at least the upper branches. It is apparently nearest *M. macrophyllum* Mart. of Brazil with diadelphous stamens and more closely nerved leaflets. In appearance it simulates *Drepanocarpus*(?) *ovalifolius* Pittier, Bol. Soc. Venez. Cienc. Nat. 7: 149. 1941, the description not at hand.

Loreto: Mishuyacu, *Klug 479* (type, U. S. Nat. Mus.).

Machaerium Kegelii Meisn. Linnaea 21: 257. 1848.

Liana, the straight or arcuately deflexed more or less spinescent stipules lanceolate, several to 12 mm. long, persisting; leaflets 9–15, ovate or oblong-elliptic, abruptly acuminate, rounded at base, subcoriaceous, lustrous, finely reticulate-veined both sides, commonly 8–9 cm. long, about 4 cm. broad; panicles terminal, densely rusty-tomentose, 2–3 dm. long; pedicels 2–4 mm. long; bractlets at least as long as the calyx, oval, obtuse, persisting; calyx about 9 mm. long, the lower lanceolate tooth 3 mm. long; banner densely pilose without, 10–12 mm. long; stamens monadelphous; pods about 7.5 cm. long, incurved at the seed with reticulate membranous wing 1.5 cm. broad, puberulent-pilose or glabrate.—The following collection is referred by Hoehne in U. S. Nat. Herb. to *M. floribundum* Benth.

Río Acre: Seringal San Francisco, *Ule 9461* (det. Amshoff). To the Guianas.

Machaerium lanceolatum (Vell.) Macbr., comb. nov. *Nissolia lanceolata* Vell. Fl. Flum. Icon. 7: *pl. 87*. 1827, text 297. 1825. *M. secundiflorum* Mart. Ann. Naturh. Hofmus. Wien 2: 100. 1838; 62.

Becoming a high-climbing liana, unarmed (according to Hoehne the stipules sometimes persisting and aculeate), and completely glabrous except for the finely ashy-puberulent axillary and terminal panicles; leaflets 5–7, ovate or oblong, obtuse or shortly acuminate, concolor, usually 6–10 cm. long, 3–4 cm. broad, rather conspicuously reticulate-veined; flowers sessile, many, 5–6 mm. long, very fragrant, the banner sericeous, orbiculate, emarginate; calyx 2–3 mm. long,

the minute teeth obtuse; stamens monadelphous; ovary stipitate, villous; pods glabrous, to 7 cm. long, ordinarily shorter, 6 mm. broad at the black seed, above the middle 10–12 mm. broad, rounded at tip.—Following precedent, the Vellozo name, as in similar cases identified by Bentham, is to be taken up for this variable species. Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 73;* Hoehne, Fl. Bras. 25, pt. 3: *pl. 50.*

Peru (possibly; cf. *M. peruvianum*). Brazil.

Machaerium leiophyllum (DC.) Benth. in Ann. Naturh. Hofmus. Wien 2: 100. 1838. *Nissolia leiophylla* DC. Prodr. 2: 258. 1825.

Usually unarmed, or sometimes spinescent by the recurved, more or less persisting stipules; branchlets lenticellate, a little viscid-puberulent, the usually short but branched terminal (and upper axillary) panicles densely bright brown pilose-tomentose; leaflets 7–9, often unequal, bright green, glabrous above, sparsely appressed pilose beneath, subcoriaceous, oblong-lanceolate, acuminate, 3–5 (8) cm. long, 1.5–2.5 (3) cm. wide; primary nerves about 14 each side, obvious but not prominent; flowers subsessile, 8–9 mm. long; banner sericeous; keel somewhat curved; stamens monadelphous; ovary pubescent; pods ovate, 5–7 cm. long, 2 cm. wide at the seed, attenuate into a coriaceous wing smaller than the seed portion.—Ducke, Archiv. Jard. Bot. Rio Jan. 3: 151. 1922, has pointed out that this species particularly has a fruit transitional to the subgenus *Drepanocarpus.* Illustrated, Hoehne, Fl. Bras. 25, pt. 3: *pl. 46.* F.M. Neg. 6941.

Loreto: Florida, *Klug 2225* (det. Hoehne). Colombia to the Guianas. "Jeyisife-o" (Huitoto).

Machaerium longifolium Benth. Journ. Linn. Soc. Bot. 4: Suppl. 55. 1860; 235.

Diffuse or scandent, the branchlet tips, leaf rachi and to a less extent the leaflets beneath as the inflorescence branches loosely ashy-pilose; stipules 5–10 mm. long, broadly lanceolate becoming indurate, spinescent; leaflets 23–35, oblong, obtuse or retuse, closely lineate-veined, lightly pilose both sides, 2.5–3 cm. long, 5–8 mm. wide; panicles defoliate in the axils, branches sometimes nearly glabrous, pedicels 2–4 mm. long, bractlets orbicular, slightly striate, glabrous, 2 mm. long; calyx 5–6 mm. long, the short teeth truncate or very obtuse, the lower a little narrower and longer; banner reflexing,

sericeous without, purple-violet, the whitish wings and keel strongly arcuate; stamens isadelphous; ovary long-stiped, falcate; pods glabrous or sparsely pilose, 5 cm. long, intruded at the seed, the wing oblong, 8–10 mm. broad at the middle, the stipe to 10 mm. long, villous (immature).—Description after Bentham, who noted that the species differs from *M. aculeatum* chiefly in its longer, more hairy and thinner leaflets and some other details which give it a distinctive aspect; the description by Hoehne seems to be a mixture since he includes several other proposed species. According to Ducke it is a non-scandent plant forming impenetrable thickets.

Peru (possibly; cf. *M. Schunkei; M. Bangii*). Brazil; Colombia?

Machaerium longistipitatum Hoehne, Arq. Bot. Est. S. Paulo, n. sér. 1: 48. *pl. 59.* 1939.

Unarmed tree, attaining about 8 meters, the younger parts yellowish puberulent; leaflets 9–13, oblong-elliptic, rounded at both ends or barely acutish, sometimes lightly emarginate, 3 cm. long or the larger 5–7 cm. long, about 2 cm. broad, always perfectly alternate at maturity, glabrous; inflorescence axillary with simple or with few elongating branches, these floriferous to about the middle; pedicels 1 mm. long; calyx 3.5 mm. long, the teeth triangular, obtuse; banner sericeous, 7–8 mm. long, the petals glabrous; stamens monadelphous; ovary stiped, hirsute-pilose; pods (immature) 5–6 cm. long, about 1.5 cm. broad, lightly incurved at the seed, the stipe 15 mm. long.—*M. Millei* Standl. of Ecuador would be sought here; its leaflets are pilose, its pods estipitate. Illustrated, Hoehne, Fl. Bras. 25, pt. 3: *pl. 101.*

Peru (probably). Ecuador; Bolivia.

Machaerium lunatum (L. f.) Ducke, Archiv. Jard. Bot. Rio Jan. 3: 151. 1922. *Pterocarpus lunatus* L. f. Suppl. 317. 1782. *Drepanocarpus lunatus* Mey. Prim. Fl. Esseq. 238. 1808.

Shrub or small tree, the branches straggling or scandent, the younger as the axillary and terminal lax panicles more or less rusty-pubescent; stipules indurate-spinescent, sometimes 6–8 mm. long; leaflets 5–11, oblong or obovate, obtuse or retuse, the larger 2.5–3.5 cm. long, 1–2 cm. broad, closely lineate-veined, glabrous in age; flowers secund, 8–10 mm. long; bractlets orbiculate, caducous, half as long as the glabrous or puberulent calyx, this 4 mm. long, its teeth very short and broad; banner reflexing, sericeous or glabrate without; stamens monadelphous; ovary stiped, glabrous or nearly;

pods so strongly lunate-falcate that they form a nearly complete circle, 2.5–3.5 cm. broad, glabrous or minutely tomentulose, veiny.—The fruits are said to be a principal food of the "Hoatzin" or Cigana, *Opisthocomus hoazin* (P. L. S. Miller), the well-known bird of the Amazon and the Guianas. Illustrated, Hoehne, Fl. Bras. 25, pt. 3: *pl. 15.*

Loreto: Mouth of Río Catalina, Río Ucayali, (*Huber*). Brazil to Venezuela and the Guianas; West Indies; Central America; tropical Africa. "Aturiá."

Machaerium peruvianum Macbr., spec. nov.

Ut videtur inerme; foliolis 5, late ovato-ellipticis breviter acuminatis, 5–9 cm. longis, 3–4.5 cm. latis, utrinque paullo nitidulis subcoriaceis, subtus minutissime sparseque puberulis vel glabris, supra glabris; racemis folio brevioribus 6–10 cm. longis haud vel paullo ramosis minute puberulis, calycis fere 2.5 mm. longis, sericeo-pilosis, distincte dentatis, laciniis superioribus obtusis, infima acuta et conspicue productiore; vexillo 6 mm. longo, leviter vel vix sericeo; staminibus diadelphis; legumine ubique breviter piloso longiuscule stipitato, 6–6.5 cm. longo, venoso ad semen mediocriter intruso circa 1 cm. lato, ala 2 cm. lata.—Pods not blackening in drying as in typical *M. lanceolatum* with different calyces and monadelphous stamens to which species the following material has been referred; the much broader pods approach those of the varieties which have more leaflets as does *M. Salzmanni* Benth. with still larger flowers and pods. My description of flowers noted by collector as "chestnut-purple" is from the Ule specimen.

San Martín: Tarapoto, shrub, *Williams 3441*, type; *Ule 6447* (probably).

Machaerium Schunkei Macbr. Field Mus. Bot. 4: 90. 1925.

Tree about 4 meters high, the branchlets glabrous, the stipules finally indurate spinescent, about 9 mm. long; rachis and panicles loosely rusty-villous; leaflets commonly 17–23, broadly elliptic-oblong, mostly 2 cm. long, 1 cm. broad, rounded at base, obviously retuse, sparsely subappressed pilose both sides, obscurely reticulate, only the midnerve prominent; flowers pedicellate, the appressed bractlets persisting; calyx about 5 mm. long, subtruncate except for the obtuse lower tooth, glabrate at least in age; stamens diadelphous; pods glabrous, 6.5 cm. long, slightly contracted at the seed; the chartaceous wing 1.5 cm. broad above the middle, the stipe 5–8

mm. long, villous.—Included by Hoehne in *M. longifolium*, which seems to me entirely different. The type was from a small tree 4 meters high, the trunk and branches sparsely spiny, the name given for Carlos O. Schunke, naturalist of La Merced.

Junín: Sandy valley floor, La Merced, *5432*, type.

Machaerium tortipes Hoehne, Arq. Bot. Est. S. Paulo, n. sér. 1: 49. *pl. 61.* 1939.

A small tree, the younger branchlets shortly tomentose; stipules caducous; leaflets nearly opposite, 15–25, oblong, rounded at both ends or sometimes minutely emarginate and mucronulate at tip, finely puberulent, 3.5–6 cm. long, 1–1.5 cm. broad, the petiolules 2 mm. long; panicles axillary and terminal, gracefully recurving, tomentulose; pedicels more or less curved, 2–3 mm. long; lower calyx tooth acute, the others obtuse; banner obovate, 8–9 mm. long, pilose without as the petals; stamens diadelphous; ovary stipe genuflexed; pods (immature) lightly intruded at the seed, shortly pilose.—Illustrated, Hoehne, Fl. Bras. 25, pt. 3: *pl. 98.*

Río Acre: Cidade Río Branco, *Ducke 24198*, type.

19. DALBERGIA L. f.

Trees or high-climbing lianas with alternate unequally pinnate (rarely 1-foliate) leaves, the leaflets mostly alternate, estipellate and with small often numerous purple or white flowers borne in axillary or terminal dichotomous cymes or irregularly developed racemes or panicles. Stipules small, often deciduous. Bracts as usually the bractlets minute, subpersisting. Upper calyx teeth broader, the lower often longer. Banner ovate or orbicular, the wings oblong, the other keel petals dorsally connate at tip. Stamens all connate and the sheath cleft above or the vexillar free or lacking, or the sheath cleft into two parts. Anthers usually dehiscent apically, didymous, their cells placed back to back, or if longitudinally dehiscent, usually spreading at base. Ovary stiped, few-ovuled, the short incurved style with small terminal stigma. Pods samaroid, orbicular, oblong or linear, plane, indehiscent, 1-seeded or remotely seeded, not margined or winged. Seeds reniform, plano-convex.—Name honors the Swedish botanist Dalberg.

One or more species of *Dalbergia* furnish the tulipwood, rosewood or kingwood of commerce, the last said to be from *D. cearensis* Ducke, a Brazilian species similar to *D. frutescens* but arborescent.

The "gacuranda" at base of the lower Amazon is, according to Ducke, *D. Spruceana* Benth. It may attain 40 meters and among known Peruvian species most suggests *D. iquitosensis* but its larger flowers are borne in simple terminal panicles and its leaflets are glabrous or nearly. According to Allemão the greater part of the rosewood is from *D. nigra* (Allem.) Benth., a purely Brazilian species; cf. also *Machaerium*.

Leaflets small to medium, few if any 3 cm. wide, or rarely some wider.
  Leaflets many (29–35), 3–5 mm. wide.....*D. inundata.*
  Leaflets few to 17, 5–15 mm. wide or wider.
    Flowers cymose, the cymes often panicled and terminal.
      Leaflets mostly 7–15 mm. wide.....*D. iquitosensis.*
      Leaflets mostly 2–3 (4) cm. wide.
        Leaflets obtuse or acutish.....*D. frutescens.*
        Leaflets acute or acuminate.....*D. riparia.*
    Flowers subracemose, axillary.
      Leaflets 5–9, 2.5 to several cm. long.....*D. subcymosa.*
      Leaflets 11–15, rarely 2.5 cm. long.....*D. debilis.*
Leaflets regularly at least 3 cm. wide, rarely solitary (cf. *D. riparia*).
  Leaves appressed silvery pubescent beneath, even in age.
D. hypargyrea.
  Leaves glabrous or minutely pubescent beneath.
    Pods thin, flat or little concave, glabrous; leaflets often broad.
D. Monetaria.
    Pods thick, concave, tomentose; leaflets oblong or ovate.
D. Riedeli.

Dalbergia debilis Macbr., spec. nov.

Arbuscula, ramulis junioribus tenuibus dense brunneo-villosis; foliorum rhachis cum petiolo villosula 3–6 cm. longa, foliolis 11–15 anguste ovato-lanceolatis, sensim acuminatis, mucronulatis, plerumque 2–2.5 cm. longis, 6–7 mm. latis, supra minute sparseque pilosis, mox glabris, subtus adpresse pilosis; nervo medio paullo lateralibus haud prominulis; racemis axillaribus folio multo brevioribus plus minusve ramosis dense secundifloris subadpresse hirsuto-villosis; pedicelis 0.5 mm. longis; floribus 4 mm. longis; calycis laciniis omnibus ovatis vix inaequalibus, inferioribus subacutis; vexillum glabrum; staminibus 10 diadelphis; legumen ignotum.

In the one flower examined the two stamen groups are equal. The species seems to be distinct in character of leaves from all of those with diadelphous stamens; in vegetative characters it resembles *D. ferrugineo-tomentosa* Hoehne and *D. subcymosa;* the former has different pubescence, the latter fewer and larger leaves; cf. also *D. oxyphylla* Harms ex Kuntze, Rev. Gen. 3, pt. 2: 49. 1898, of Bolivia.

Loreto: Shrub, 2 meters, flowers white, Florida, *Klug 2286*, type.

Dalbergia frutescens (Vell.) Britton, Bull. Torrey Club 16: 324. 1889. *D. variabilis* Vog. Linnaea 11: 196. 1837; 219. *Pterocarpus frutescens* Vell. Fl. Flum. Icon. 7: *pl. 96*. 1827, text 302. 1825.

Glabrate or the leaves beneath and the often ample dichotomously branched cymes minutely pubescent; leaflets 5–13, ovate-oblong or acutish, finally subcoriaceous, veiny and lustrous above, paler beneath, 3.5 to 8 cm. long, 2–3 cm. wide; cymes shorter than the leaves or longer and paniculate above, the flowers very many, crowded (3 mm. long), subdioecious, subsessile; calyx teeth obtuse; stamens monadelphous; banner bilobed; pod stipe 4–8 mm. long, longer than the calyx, the pod 3–6 cm. long, 10–22 mm. wide, glabrous or glaucous-puberulent, beautifully reticulated and firm at the middle about the seed.—Vine or exceptionally small tree, the flowering branchlets more or less scandent.

San Martín: Chazuta, *Klug 3996*. Juanjuí, *Klug 4286*. Moyobamba, *Klug 3579* (all lianas). Tarapoto, *Spruce 4517*.—Loreto: Mishuyacu, 6-meter tree in clearing, *Klug 1007* (det. Harms). Mouth of Santiago, vine climbing high tree, *Mexia 6375* (det. Standl.). Balsapuerto, *Klug 2935* (det. Standl.).—Río Acre: (fide Ducke). Brazil; Bolivia.

Dalbergia hypargyrea Harms, Notizbl. Bot. Gart. Berlin 9: 973. 1926.

Vigorous liana, the younger branchlets puberulent; leaves 6–12 cm. long with 3–7 often alternate petiolulate leaflets (petiolules 4–7 mm. long); leaflets elliptic-obovate, rounded at base, shortly acuminate, chartaceous, glabrous above, closely and finely appressed sericeous beneath, mostly 6–13 cm. long, 3–7.5 cm. broad, with 7–11 subparallel lateral nerves prominent especially beneath; panicles much branched, more or less appressed velutinous, often 1.5 dm. long or longer; flowers small, sessile or subsessile; bractlets broadly obovate; calyx minute, acutely denticulate, about 3 mm. long; banner slightly pilose without, nearly 5 mm. long, all the petals

clawed; stamens 10, all connate; ovary and long stipe appressed hirsutulous, the young pods brownish velvety.—Leaves suggest those of *Cornus;* extremely thick liana, 25 meters high, the faintly scented flowers with olive green calyx, brown pubescent, the petals bright yellowish green except for the carmine-streaked banner.

Hoehne, Fl. Bras. 25, pt. 3, fasc. 4: 19, reduces this species to *D. Lindeniana* (Benth.) Hoehne, a Venezuelan plant with entirely different pubescence and inflorescence; indeed it appears from F.M. Neg. 3297 that Bentham's species is a *Machaerium* as originally described. F.M. Neg. 2267.

Loreto: Mouth of the Santiago, flood-free wood, *Tessmann 4549,* type; *4705.*

Dalbergia inundata Spruce ex Benth. in Mart. Fl. Bras. 15, pt. 1: 27. 1862.

Becoming a small tree (or sometimes the branches scandent) distinctive among the Peruvian species by the numerous leaflets, these commonly 29–35, oblong, obtuse, the younger as the short racemes more or less villous with silky yellow trichomes, the mature glabrate, green above, pale beneath usually 12–16 mm. long, 4–6 mm. broad, oblique at base, rounded, but minutely mucronulate at tip; racemes 1 or several to 5 cm. long, the narrow bracts to 3 mm. long, shortly exceeded by the pedicels; calyx 4 mm. long, deeply bilabiate, all the segments acute; banner ovate; stamens 10, the vexillar (and sometimes the carinal) free; ovary shortly stiped, glabrous with usually 4 ovules; pods more or less falcate-subreniform, about 2 cm. long, half as broad.—*Drepanocarpus paludicola* Standl., Trop. Woods 35, is probably this plant. Flowers purplish. Illustrated, l.c. *pl. 61;* Hoehne, Fl. Bras. 25, pt. 3, fasc. 4: *pl. 9.*

Loreto: Lower Río Nanay, *Williams 525* (det. Harms). Iquitos, *Williams 1504; Tessmann 3641* (det. Harms with query). Brazil. "Jacaranda," "tucunarí," "meradiu."

Dalbergia iquitosensis Harms, Notizbl. Bot. Gart. Berlin 9: 974. 1926.

Scandent, the younger branchlets laxly villous; leaves 5–9 cm. long with 9–15 subsessile oblong leaflets obliquely subcordate or rounded at base, barely acute or obtusish, often mucronulate, soon glabrous above, laxly and finely pilose beneath especially on the rather prominent midnerve and lateral veins, firm-chartaceous, 1.5–3.5 cm. long, 7–15 mm. wide; cymes dichotomous, thyrsoid, densely

flowered, lightly villous, with the peduncles 4–5 cm. long, 2.5–4 cm. broad; flowers small, on pedicels 1–2 mm. long; bractlets minute, oblong, obtuse, shorter than the calyx, this pilose, the connate upper teeth emarginate, the lateral broadly lanceolate, acute, the lowest longer, acute, nearly 3 mm. long; banner oblong, 4 mm. long; stamens 9 or 10, all connate; ovary definitely stiped, hirsute villous, with 1–2 ovules.—Hoehne, Fl. Bras. 25, pt. 3, fasc. 4: 12. 1941, suggested that this plant is the same as *D. Glaziovii* Harms; that Brazilian species however is a tree with a dense rusty tomentosity on the younger parts, the leaflets 9–25, ovate-lanceolate, coriaceous. Rather *D. iquitosensis* seems to be allied to *D. acuta* Benth. as indicated by Harms; it resembles also *D. frutescens* but at least until more material is available may be regarded as distinct. Liana 3 meters high, calyx bright green, the corolla bright orange, bright yellowish at base (Tessmann). F.M. Neg. 2268.

Loreto: Flood-free areas, Iquitos, *Tessmann 5052*, type.

Dalbergia Monetaria L. f. Suppl. 317. 1781. *D. volubilis* (L.) Urban, Repert. Sp. Nov. 16: 136. 1919. *Securidaca volubilis* L. Sp. Pl. 707. 1753, in small part; cf. Oort, Med. Bot. Rijks Herb. Utrecht 71: 678. 1940. *Ecastaphyllum Monetaria* (L. f.) Pers. Syn. 2: 277. 1807; 228.

Smooth or nearly smooth liana, the short branchlets sometimes cirrose, the many leaves with 3–5 (rarely only 1), ovate shortly acuminate leaflets, broadly rounded at base, these soon coriaceous, lustrous especially above, veiny, glabrous or lightly pubescent beneath, usually 5–8 cm. long, 4–6 cm. broad; racemes short, paniculately crowded in the leaf axils or at the nodes of leafless branches, usually only 2–3 cm. long, more or less pilose; petals 2–3 mm. long, about as long as the calyx; stamens usually 9; ovary glabrous, long-stiped; pods usually 2.5 cm. long, about 2 cm. broad, typically orbicular, sometimes oblong or subreniform, 1-seeded.—Typically found in inundated areas (Ducke).

The variety **hygrophila** (Mart.) Macbr., comb. nov., *Ecastaphyllum hygrophilum* Mart. ex Benth. Ann. Naturh. Hofmus. Wien 2: 93. 1838; *Hecastophyllum Monetaria* (L. f.) Pers. var. *hygrophilum* (Mart.) Benth. in Mart. Fl. Bras. 15, pt. 1: 229. 1862, differs in its shorter and broadly oblong, 2.5 cm. long, 16–18 mm. broad, sometimes subreniform pod, and has been found according to Hoehne near the Peruvian boundary. A specimen by Klug, *2015*, Río Putumayo, Loreto, has been referred by Hoehne, Fl. Bras. 25, pt. 3, fasc.

4: 22, to "*D. nitida* (Radlk.) Ducke," a name for which Hoehne gives no reference and which I have not found. The distinguishing feature, if any, seems to be the silky pilosity of the young leaves (leaflets 5) the mature appressed puberulent beneath, to 14 cm. long, 8 cm. wide. Apparently this form is *E. nitidum* Mart. ex Benth., Ann. Naturh. Hofmus. Wien 2: 93. 1838, and may become *D. Monetaria* var. **nitida** (Mart.) Macbr., comb. nov. Probably a form to be included is *D. Riedeli* (Radlk.) Sandw. *D. Ecastaphyllum* (L.) Taub. may be the earlier name for this species sens. lat., but it is typically a coastal plant, the leaves always 1-foliate. Illustrated, Mart. Fl. Bras. 15, pt. 1: *pls. 63–64;* also Hoehne, Fl. Bras. 25, pt. 3: *pls. 17–20* (including vars.).

Loreto: Iquitos, (*Ducke 14311*); (*Killip & Smith 29048*); Florida, *Klug 2015; 2251.*—Río Acre: *Ule 9466.* To eastern Brazil, Trinidad and Santo Domingo. "Gochaño" (Huitoto).

Dalbergia Riedeli (Radlk.) Sandw. Kew Bull. 358. 1931. *Ecastaphyllum Riedeli* Radlk. in Koepff, Anat. Char. Dalb. 41. 1892.

Liana; leaflets oblong or sometimes ovate, acutely acuminate, mostly 7–9 cm. long, 3–4 cm. broad, glabrous, lustrous, drying greenish brown above, paler and rusty tomentulose beneath, or at maturity merely puberulent; stamens 9, one free, the remaining equally diadelphous; pods suborbicular, thick and deeply concave, about 3 cm. wide, densely appressed silky-pilose.—The type is *Spruce 1546* in flower, not seen by me; it was included by Bentham in his *E. Monetaria* var. *Riedeli;* cf. note under *D. Monetaria.* My description of the pods is from *Smith 2864* (Br. Guiana) referred here by Sandwith himself; this matches well enough the Peruvian plant but it has more ovate leaves. Amshoff, Med. Bot. Rijks Herb. Utrecht 52: 52. 1939, included here *D. enneandra* Hoehne (*D. pachycarpa* Ducke) but the pods of that species while thick are not at all concave, at least as to cotype specimens of Ducke's plant.

San Martín: Pongo de Cainarachi, *Klug 2739* (*D. Monetaria,* fide Hoehne). Brazil to the Guianas.

Dalbergia riparia (Mart.) Benth. Journ. Linn. Soc. Bot. 4: Suppl. 31. 1860. *Triptolemea riparia* Mart. Flora 20: Beibl. 2: 122. 1837.

Similar to *D. frutescens* but the leaflets 5–9, usually (when mature) somewhat larger (3–4 cm. broad) and more or less acuminate;

flowers often more numerous; pods subsessile or shortly stiped.—Upper branches apparently becoming scandent. Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 59;* Hoehne, Fl. Bras. 25, pt. 3: *pl. 2.*

Peru (fide Ducke). Brazil.

Dalbergia subcymosa Ducke, Archiv. Jard. Bot. Rio Jan. 3: 144. 1922. *Ecastaphyllum pubescens* DC. Prodr. 2: 421. 1825, not *D. pubescens* Hook. f., 1849.

Rather similar to *D. Monetaria* in inflorescence but the stipules often subpersisting, 5–10 mm. long, the leaflets 5–9, lanceolate, usually less than 2 cm. wide, (2) 4–5 (8) cm. long, sharply acute; bracts and bractlets well persisting; petals white, long-clawed, 5–7 mm. long; stamens 9; ovary long-stiped, glabrous unless ciliate.—In non-flooded areas (Ducke). F.M. Negs. 2272; 6992 (*E. pubescens*).

Loreto: Near Iquitos, *Klug 1300* (det. Hoehne); *1365.* Brazil.

20. DOLICHOS L.

Rather coarse, perennial vine with the character of *Phaseolus,* but with the keel curved at a right angle, in this respect suggesting *Vigna.* Flowers clustered on tubercle-like nodes in a long or sometimes short raceme, the peduncles elongate and bearing one leaf. Leaves pinnately 3-foliolate. Calyx campanulate, shortly 4-lobed. Banner conspicuously calloused between the center and the base, the callus 4-lobed forming a small auricle on each side of the standard. Uppermost stamen free, the remaining united, the anthers uniform. Style flattened toward the tip where hairy along the upper edge below the stigma. Pod flattened, broadly oblong, slightly recurving at maturity, 2–4-seeded, the seeds partially separated.

Dolichos Lablab L. Sp. Pl. 725. 1753.

Leaflets ovate, deltoid, more or less pilose, the lateral somewhat unsymmetrical, commonly 7 cm. long, about as wide in the vicinity of the broad nearly truncate base; racemes lax, the bractlets 4 mm. long, caducous, the calyx 6–8 mm. long, densely pubescent on the margin between the lobes, the flowers white or purple, with banner wider than long, the length rarely 15 mm. long; pods reflexed along the margins, at maturity smooth or nearly, 4–8 cm. long, about 2 cm. broad, the seeds white or reddish tinged, sometimes dark purple or black.

Cultivated in the tropics, the seeds of the lablab sometimes used as a substitute for beans, although somewhat bitter; "the slaves on

the plantations consume them in quantities and remove the bitterness by leaving them in hot water over night" (Ruiz & Pavón).—Illustrated, Degener, Fl. Hawaii.

Cajamarca: Cascas, *Raimondi*.—Huánuco: Cultivated or spontaneous, near Huánuco, *2323*.—Cuzco: Machu-picchu, 2,400 meters, *Herrera 1980*. Africa. "Plantigras," "cencapuspu," "frejol de Antibo."

21. VIGNA Savi.

Nearly *Phaseolus* but the keel not coiled but strongly bent inwards.—The bracts and bractlets are small, deciduous, the calyx-tube short, the style bearded longitudinally within, the pods not septate. The species included here approach *Pachyrrhizus* on one side and *Phaseolus* on the other and indeed their separation from the latter is merely academic. One species is sometimes erect.

Besides the following a specimen by Klug from Iquitos probably distinct but in fruit should be mentioned; the stems are hirsute, leaflets oblong-lanceolate, stipules narrow, distinctly produced, pods villous, 3.5 cm. long, 7 mm. broad, seeds black, strophiolate.

Stipules conspicuously produced at base.....*V. unguiculata.*
Stipules not produced.
Calyx apparently only 4-toothed; keel not spurred.....*V. luteola.*
Calyx 5-toothed; keel spurred on one side.....*V. vexillata.*

Vigna luteola (Jacq.) Benth. in Mart. Fl. Bras. 15, pt. 1: 194. *pl. 50*. 1859. *Dolichos luteolus* Jacq. Hort. Vindob. 1: 399, *pl.* 90. 1770. *D. repens* L. Syst. ed. 10. 1163. 1759. *V. repens* (L.) Kuntze, Rev. Gen. Pl. 3, pt. 2: 74. 1898, fide Amshoff, not Baker, 1876. *V. brachystachys* Benth. Bot. Voy. Sulph. 86. 1844, at least as to Peruvian specimens.

Herbaceous vine, twining or when no support as shrubs available, prostrate; flowers yellow and almost capitately crowded at the tips of the usually greatly elongated peduncles, these slender and as the much shorter petioles more or less conspicuously pilose with spreading yellowish trichomes or sometimes glabrate; leaflets ovate-lanceolate, acuminate or rarely obtusish, rounded or broadly cuneate at base, glabrous or sparsely pubescent, commonly 4 cm. long, 2.5–4 cm. wide; pedicels 2 mm. long; calyces campanulate, 4–5 mm. long, the three lower acute teeth shorter than the tube; banner to 17 mm. long, 2 cm. wide, bicalloused basally, the semiorbicular keel

obtuse but slightly beaked; pods linear, more or less pubescent or loosely pilose, 4–7 cm. long, 7 mm. broad, with 8–12 black lustrous seeds, the oblong hilum white.—The widely distributed *V. marina* (Burm.) Merrill has leaves rounded at apex, flowers on pedicels 3 mm. long, grayish-brown seeds.

Cajamarca: Near Socota, Prov. Cutervo, 2,800 meters, *Stork & Horton 10112.*—Lima: Callao, (*Wilkes Exped.*, det. Gray as *V. brachystachys*). Near Lima, obnoxious weed, *60.* Chosica, *538.* Ancón, *Mexia 8102.*—Ayacucho: Huanta, *Raimondi.*—Huánuco: Near Huánuco, *3224.*—Libertad: Pacasmayo, *Raimondi; Rose.* Chicama Valley, *Smyth 13.*—San Martín: Chazuta, *Klug 4087.*—Loreto: Pongo de Manseriche, *Mexia 6171.* Near Iquitos, *Williams 1361; 3537.* Cosmopolitan in warm regions.

Vigna unguiculata (L.) Walp. Repert. Bot. 1:779. 1842. *Dolichos unguiculata* L. Sp. Pl. 725. 1753. *V. Catjang* Walp. Linnaea 13: 533. 1839. *D. sinensis* L. Cent. Pl. 2: 28. 1756. *V. sinensis* Endl. ex Hassk. Pl. Jav. Rar. 186. 1848.

Glabrous herbaceous vine or sometimes erect with large ovate or lanceolate, obtuse or acutish stipules that are conspicuously produced at base; leaflets rhomboid and strongly oblique, especially the lateral, at base; peduncles long, bearing apically and closely a few large pink, purple or yellow flowers; calyces 6–8 mm. long, the 3 lower teeth acuminate, the upper broad, bidentate; banner 1.5–2 cm. long, the keel obtuse; pods linear, slightly compressed, glabrous, to 1 cm. broad, 1–several dm. long.—Naturalized and widely cultivated in warm regions for food or forage as "cow pea" or "catjang."

Junín: Trailing on sandy stream bank, flowers yellow, La Merced, *5540.*—Ayacucho: Río Apurímac, *Killip & Smith 22850.*—San Martín: Near Tarapoto in clearing, *Williams 6865.*—Loreto: Río Nanay, *Williams 813.* Native to tropical Asia. "Chiclayo," "catjang."

Vigna vexillata (L.) Rich. in Sagra, Hist. Cuba 10: 191. 1845. *Phaseolus vexillata* L. Sp. Pl. 724. 1753.

With many of the characteristics of *V. luteola* but commonly coarser, the stems often conspicuously pilose, the leaflets usually more elongate lanceolate, 5–13 cm. long, 1.5–3 (5) cm. wide, pubescent; pedicels 1–2 mm. long; calyx 1 cm. long, pilose, the acuminate teeth 5, the 3 lower about as long as the tube; banner 2–2.5 cm. long, the keel obtuse; pods linear, pilose, 7–10 cm. long, 5 mm.

broad, the blue or black lustrous seeds with oblong white hilum.—Flowers yellow marked with purple or lilac and violet to pinkish blue. Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 50.*

Junín: La Merced, *Killip & Smith 23779.*—Loreto: Río Paranapura, *Klug 3957.* San Isidro, *Tessmann 4965.* Widely distributed in warm regions, both hemispheres.

22. PACHYRRHIZUS Rich.

High-climbing herbs resembling *Phaseolus* but with caducous, small, setaceous bracts and bractlets and, especially, the keel straight, merely incurved, the style subinvolute and complanate apically, introrsely pilose, the globose stigma lateral. Pods linear, transversely depressed by the separation of the seeds within.

The fleshy tuber yields a superior edible starch; the plant is the "yam-bean" of the English; cf. Cook & Collins, Contr. U. S. Nat. Herb. 8: 208. 1903.

Pachyrrhizus tuberosus (Lam.) Spreng. Syst. 281. 1827. *Dolichos tuberosus* Lam. Encycl. 2: 296. 1786.

Vigorous climber from a large tuberous root that supplies useful food because of its high starch content; leaflets rhomboid, entire but slightly angled, the lateral strongly oblique; flowers in clusters of 2 or 3, generally crowded along the upper half of the very long raceme-like inflorescence; calyx about 1 cm. long, appressed rusty pilose; flowers white or yellow, 1.5 to nearly 2 cm. long, the basal auricles of the standard directed upwards; pods to 2 dm. long, scarcely 2 cm. broad, with triangular beak to 3 mm. long, the large seeds usually red.—*P. erosus* (L.) Urban (*P. angulatus* Rich.) seems scarcely to differ, but the leaflets are supposed to be more angular, the flowers always violet, the pods about half as large.

Piura: *Weberbauer 6416.*—San Martín: Moyobamba, *Raimondi.*—Loreto: Florida, cultivated in clearing, *Klug 225.* Near Iquitos, *Tessmann.* Tropical regions. "Habillo del monte," "gose-o-" (Huitoto), "yaspo" (Huitoto), "wuiso," "ajipa."

23. PHASEOLUS L.

Reference: Piper, Contr. U. S. Nat. Herb. 22: 673–701. 1926.

Twining, rarely woody at base or erect, with pinnately 3-foliolate, stipellate leaves (the leaflets rarely reduced to one), and with persisting, striate stipules. Flowers white or variously colored, fasciculately

racemose above the middle of axillary peduncles, these more or less nodose. Bracts usually caducous, the often broader bractlets sometimes persisting. Upper calyx teeth connate or free. Banner orbicular or obovate, rarely contorted, equaled or exceeded by the obovate or rarely oblong wings, these adhering to the long, obtuse spiraled beaked keel, or the spiral sometimes incomplete. Vexillar stamen free, often enlarged or appendaged above the base, anthers uniform. Ovary subsessile, many-ovuled, the style enlarged, usually longitudinally bearded below the tip, the stigma lateral or oblique. Pod linear or oblong, straight or falcate, compressed or subterete.—Besides the above paper, I acknowledge my indebtedness to Hassler, "Revision of the South American Phaseoli," Candollea 1. 1923. Unfortunately neither treatment is complete.

The well-known "lima bean" is *P. lunatus;* the commonly cultivated bean or "kidney bean" is *P. vulgaris,* both described below; the former in Peru is "los pallares," others being known by the collective names "purutu" or "poroto" (Herrera).

Phaseolus stipularis Lam. Encycl. 3: 74. 1789, has not been placed; according to description the stem is erect, simple, glabrous, angular, attaining about 1 dm.; leaflets oval, very obtuse, the terminal especially sinuately trilobed, peduncles axillary, much longer than the leaves, bearing at tip congested, sessile flowers with brown banner, the two wings yellow, the keel whitish and coiled; pods cylindrical, about 4 cm. long, nearly glabrous, borne horizontally. The stipules especially at the tip are large, oval, and resemble those of *Dolichos trilobus,* illustrated in the Fl. Indica of Burman. This bean grows naturally in Peru, and is cultivated in the Jardin du Roi, the seeds sent by Dombey. Character, in part, suggests *Vigna.*

Banner contorted, large; keel many times coiled; racemes strongly nodose..... *P. Caracalla.*

Banner not contorted.

Keel loosely coiled, forming at most one spiral; flowers large unless in *P. peduncularis* (10–17 mm. long).

Flowers large, 2.5–4 cm. long.

Calyx about 10 mm. long; leaves densely pilose especially beneath..... *P. megatylus.*

Calyx 3–6 mm. long; leaves often glabrous above.

Calyx campanulate, as long as broad, the lower teeth more or less developed..... *P. appendiculatus.*

Calyx shallowly cupulate, broader than long, nearly truncate.....*P. latidenticulatus.*

Flowers small, rarely more than 12 mm. long..*P. peduncularis.*

Keel tightly or closely coiled, even if forming only one spiral; flowers small except *P. polytylus, P. adenanthus, P. linearis.*

Pedicels well developed at full anthesis, about as long or longer than the calyces; calyx-tube longer than the teeth.

Banner usually more or less pubescent; pods lunate, few-seeded.....*P. lunatus.*

Banner glabrous or essentially at least by anthesis; pods many-seeded.

Bracts and bractlets minute, 1–2 mm. long...*P. revolutus.*

Bracts or bractlets conspicuous.

Bractlets broad, about equaling the calyx; flowers few, the racemes short.....*P. vulgaris.*

Bracts or bractlets narrow; flowers many, the racemes elongate.

Bracts 5–8 mm. long; calyces 3–4 mm. long..*P. Augusti.*

Bracts 10–14 mm. long; calyces 6–7 mm. long.
P. pachyrrhizoides.

Pedicels obsolete or much shorter than the calyces; calyx-tube often equaled by at least the lower teeth.

Flowers to 2.5 cm. long or longer.

Racemes strongly nodose; calyx broadly lobed.
P. polytylus.

Racemes shortly nodose; calyx subulately lobed.

Lower calyx teeth about as long as tube..*P. adenanthus.*

Lower calyx teeth twice as long as tube....*P. linearis.*

Flowers to about 12 mm. long.

Flowers usually purple, not yellow; stipules rarely produced; peduncles naked or fasciculate-bracted at or above base.

Plants pubescent, prostrate or twining; stipules to 7 mm. long.

Stem pubescence usually appressed or short and dense; calyx teeth often shorter than the subtubular tube.

Peduncles with a fascicle of conspicuous bracts near or above base.....*P. erythroloma.*

Peduncles naked or the bracts obscure, basal.

Calyx as leaves green, the pubescence fine, sparse. *P. longipedunculatus.*

Calyx as leaves densely pubescent. *P. atropurpureus.*

Stem pubescence spreading, long; calyx campanulate, the lower teeth as long as the tube. . *P. fraternus.*

Plants glabrate, erect or only the tips twining, stipules to 1 cm. long. . . . . *P. lathyroides.*

Flowers yellow; stipules shortly produced or adnate; peduncles naked.

Lower calyx teeth about as long as tube; stems pubescent. *P. pilosus.*

Calyx teeth all shorter than tube; stems glabrate. *P. campestris.*

Phaseolus adenanthus G. F. W. Meyer, Prim. Fl. Esseq. 239. 1818; 700. *P. truxillensis* HBK. Nov. Gen. & Sp. 6: 451. 1824. *P. adenanthus* var. *caeduorum* (Mart.) Hass. Candollea 1: 442. 1923.

Glabrous to puberulent or villous perennial, with usually ovate acute leaflets, rounded or broadly cuneate at base; peduncles often longer than the petioles; calyces subsessile, the upper tooth broad, truncate, the falcate, lateral ones and the lower narrow and acute, subequaling the tube; bracts minute, the bractlets oblong, acuminate, shorter than or subequaling the calyx; flowers showy, variously colored, the banner often yellowish, about 2 cm. long; wings obovate, to 3 cm. long, 1 cm. broad, the keel twice spiraled; pods linear, falcate, appressed pubescent, 7–10 cm. long, about 1 cm. broad.—Variable in leaflet form and pubescence; extreme variants include var. *latifolius* (Benth.) Hassler, l.c. 443, the pubescence dense, rather tomentose and var. *radicans* (Benth.) Hassler, l.c., the creeping stems rooting at each node, the leaflets and flowers smaller.

Cajamarca: Nanchoc, (*Raimondi*).—Lima: Callao, *Gaudichaud 129; Pavón.* Lurín, *Ruiz & Pavón* (det. Harms). Above Pisco, *Weberbauer 5363* (det. Ulbr.).—Cuzco: Near Quillabamba, Prov. Convención, *Mexia 8030; 8032* (det. Killip). Valle de Santa Ana, 900 meters, (*Herrera*).—Ica: Río de Pisco, *Weberbauer 5363.*—Truxillo, *Bonpland* (type, *P. truxillensis*).—Lambayeque: (*Raimondi*).—Libertad: Chicama, (*Raimondi*).

Phaseolus appendiculatus Benth. Ann. Naturh. Hofmus. Wien 2: 137. 1840; 675.

Glabrous (fide Bentham) but the Peruvian specimens distinctly pilose on the leaves beneath and somewhat so on the branches and calyces; leaflets mostly broadly ovate, acuminate, obliquely truncate or shortly cuneate at base; nodose peduncle often longer than the petiole, few-flowered, the campanulate calyces with 4 rather broad, very obtuse or acutish teeth, the upper typically 6–8 mm. long; banner little contorted, about 2.5 cm. long, exceeded by the oblique obovate wings, the keel scarcely spiraled or approximately bi-spiraled; pods linear, straight, acuminate, 6 mm. broad, 8–12 cm. long.

Lima: Climbing on cacti or boulders, Matucana, *272* (det. Piper). —Junín: Sandy flat, La Merced, *5317* (det. Piper). Puerto Yessup, *Killip & Smith 26295*.—Apurímac: Below Pajonal, 1,850 meters, *West 3677* (det. Johnst., *P. adenanthus* but keel not spiraled; cf. *P. megatylus*). Central America to Patagonia and Venezuela. "Flor de corpus," "chi-chi-saka" (West).

Phaseolus atropurpureus DC. Prodr. 2: 395. 1825; 680. *P. vestitus* Hook. Bot. Misc. 2: 213. 1831. *P. atropurpureus* var. *pseuderythroloma* Hassler, Candollea 1: 457. 1923; var. *canescens* (Mart. & Gal.) Hassler, l.c.

Sprawling or climbing and more or less canescent with subappressed or short and spreading villous pubescence, this frequently somewhat fulvous on the growing parts including the calyces; petioles usually 3–5 cm. long; leaflets more or less strongly inequilateral, broadly ovate to subrotund, rounded basally and apically to subtruncate at base, commonly with one lateral lobule, 3–5 cm. long, and nearly as broad; peduncles to 2 dm. long, bearing only a few or several sessile flowers, the subtubular calyces 6–8 mm. long, the subequal calyx teeth typically only about half as long; flowers dark purple, 17–20 mm. long; pods widely spreading, compressed, densely appressed strigillose, to 9 cm. long, 4 mm. broad.—The leaves in the Peruvian form are usually greenish above, densely ashy sericeous beneath, the veins prominent; var. *vestitus* (Hook.) Hassler. F.M. Neg. 32018.

Lima: Chancay, *Ruiz & Pavón*. Lurín, *Mathews 454*, type. Chosica, *526; Holway 783½*. Callao, *Wilkes Exped.*—Loreto: Salinas de Pibluana, Río Huallaga, *Ule 7624*.—San Martín: Tarapoto, *Spruce 4852*.—Cuzco: Prov. Anta, *Vargas 146*. North to Texas and northern Mexico.

Phaseolus Augusti Harms, Notizbl. Bot. Gart. Berlin 7: 503. 1921. *P. bolivianus* Piper, Contr. U. S. Nat. Herb. 22: 694. 1926? (cf. note below).

Loosely and rather densely pilose except the leaves above and the flowers; stipules ovate-lanceolate, to 7 mm. long; petioles 5–7 cm. long; leaflets broadly ovate, the lateral obliquely truncate at base, acute, sparsely strigillose or glabrate above, about 6 cm. long, 5 cm. wide; racemes long-peduncled, to 2 dm. long or longer, the lanceolate acuminate bracts subequaling the often geminate pedicels, these 5–7 mm. long; calyx 4–4.5 mm. long, sparsely puberulent, minutely ciliate on the margins, the teeth shorter than the tube, the lower ones deltoid, lanceolate-acuminate, little longer than the others, the lateral broadly deltoid, acute, the uppermost very broad, bifid; banner glabrous, 11 mm. long, basally reflexed, auricled, the wings nearly 15 mm. long; keel enlarged apically with the style and sparsely hirsute, spiraled 1.5 times; vexillar stamen much thickened basally; ovules 3–4; pods lightly falcate, villous, 5 cm. long, 8–9 mm. broad.—Flowers violet except for the wings, these at first lilac changing to yellow-brown (Weberbauer). *P. bolivianus* may possibly prove to be distinguishable varietally: the pubescence is less dense, more appressed, the keel, as to type, with 2 coils, the pods 6 cm. long, 1.5 cm. broad, with oval much-compressed brown seeds minutely sprinkled with white, 6 mm. wide, 8 mm. long, the hilum one-fifth as long. F.M. Neg. 2434.

Huánuco: Near Río Mantaro below Colcabamba, 2,200 meters, *Weberbauer 6439*, type. Cani, *3413* (det. Standl.).—Amazonas: Chachapoyas, *Mathews*.—Apurímac: Rocky ground among shrubs and grasses, 2,000 meters, Oropeza Valley, *Vargas 9776; 10573* (former det. Standl. as *P. boliviana*).—Cuzco: Valle del Urubamba, 3,000 meters, *Herrera 1376*. Yucay, *Soukup 726*. Bolivia. "Huillko."

Phaseolus campestris Mart. ex Benth. Ann. Naturh. Hofmus. Wien 2: 141. 1838; 678.

A rather slender more or less pilose herbaceous vine, green and glabrescent in age except the petiolules and pods, these conspicuously rufous-pilose with somewhat appressed to spreading trichomes; stipules lanceolate, scarcely or rather obviously produced at base; peduncles about as long or longer than the petioles, the few yellowish flowers congested apically; pedicels slender, 1–2 mm. long; calyces campanulate, 2.5–3 mm. long, broadly and shortly lobed above,

the short lower teeth acutish; banner broadly orbicular, emarginate, typically barely 8 mm. long, the keel spiraled once, the style glabrous or lightly barbate at tip; pods nearly subcylindrical at maturity, commonly 6 cm. long, 6 (4) –8 mm. thick, the seeds compressed with linear hilum (subglobose, fide Amshoff).

The following collections were distributed as *P. juruanus* Harms, Notizbl. Bot. Gart. Berlin 7: 506. 1921, referred by Piper to *P. campestris*. Possibly the Peruvian plant should be called *P. Schottii* Benth. var. *campestris* (Benth.) Hassl., Candollea 1: 464. 1923, the typical form of the species in this case including specimens with calyces 4–6 mm. long, the banner 12–20 mm. long. Amshoff, Med. Bot. Rijks Herb. Utrecht 52: 72–73. 1939, has discussed the application of these names; it seems probable that only one variable species is concerned. *P. trichocarpus* Wright, referred to *P. Schottii* by Piper, l.c. 678, is distinct, fide Amshoff, its stipules produced 2–3 mm. at base, its pods nearly flat, only about 3 cm. long, 6–8 mm. broad, the seeds compressed.

Loreto: Yurimaguas, *Poeppig*. Lower Río Nanay, *Williams 507; 616*. Near Iquitos, *Williams 8115; Klug 931*. Brazil to the Guianas. "Porotillo."

Phaseolus Caracalla L. Sp. Pl. 725. 1753; 677.

Vigorous, smooth or nearly, and well-marked by the showy varicolored flowers with contorted banner and with keel that is coiled several (even to 7) times; leaflets green, acuminate, commonly ovate or ovate-lanceolate, to 1 dm. long, half as broad or broader; peduncles elongate, floriferous only above the middle with subglobose nodes, the pedicels 5 mm. long; calyx lobes 4, all short, broad, obtuse, the upper emarginate; pods straight, pendulous, acuminate, glabrate, 1.5 dm. long or longer, 1.5 cm. broad, with subglobose brown seeds 7–8 mm. long.—Sometimes cultivated for the flowers, these with white to orange banner, the wings pink to violet. Illustrated, Bot. Reg. *pl. 341*.

San Martín: Near Moyobamba, *Klug 3575*.—Junín: Montañas de Chanchamayo, (*Raimondi*).—Loreto: Florida, *Klug 2059*. South America.

Phaseolus erythroloma Mart. ex Benth. in Ann. Naturh. Hofmus. Wien 2: 141. 1838.

Softly villous, twining, the semi-herbaceous striate stems sometimes glabrate in age; petioles shorter than leaves; leaflets variable

in shape, mostly obliquely ovate-subrhombic, obtuse or acute, 4–5 cm. long, 3–4 cm. broad; peduncles often 1.5–2 dm. long, prominently bracted near or above the base with a fascicle of linear-setaceous bracts commonly at least 1 cm. long; flowers small, few, the calyx 4 mm. long with 5 subequal teeth much shorter than the tube; pods 2.5–3.5 cm. long, 3 mm. broad, rufous or ashy-villous.—Similar is *P. bracteatus* Nees & Mart., upper calyx lip truncate, pods longer. F.M. Neg. 6322.

Cuzco: Machu-picchu, Urubamba Valley, *Herrera 3255* (det. Killip). To Brazil.

Phaseolus fraternus Piper, Contr. U. S. Nat. Herb. 22: 679. 1926.

Perennial from a thick oblong tuber, the slender spreading or ascending stems 3–5 dm. long, pilose with divaricate yellowish trichomes; stipules broadly lanceolate, acuminate, 7-nerved, 5–7 mm. long, persisting; leaflets oval, acute, broadly cuneate to rounded at base, subequaling the petiole, 2–3 cm. long, sparsely appressed pilose, much exceeded by the peduncles, these retrorsely pubescent, the 5–8 flowers subsessile; bracts lanceolate, 2 mm. long, the subulate bracteoles less than half as long as the obconic calyx, this 3 mm. long, the 2 upper teeth nearly as long as the tube, the 3 lower triangular ones quite as long; corolla 5 mm. long, the banner reflexed medially; pods hirtellous, linear, shortly beaked, 2–2.5 cm. long, with 4–6 oval brown seeds.—Allied according to the author to *P. heterophyllus* Willd. but the leaflets acute, the calyx lobes shorter, not subulate. Cf. *P. Schottii* Benth. under *P. campestris*.

Peru(?): Without locality, (*Ruiz & Pavón*, fide Piper). Bolivia to Uruguay.

Phaseolus lathyroides L. Sp. Pl. ed. 2: 1018. 1763.

Glabrous or lightly pilose erect or suberect annual with linear or lanceolate ovate-elliptic nearly symmetrical leaflets 3–7 cm. long; flowers in remote pairs on long slender peduncles, purplish, the slender clawed wings much longer than the banner and the keel, the latter forming one spiral; calyx tubular-campanulate, 6 mm. long; pods linear, straight, appressed strigose, 8–10 cm. long, 2–3 mm. broad.—The var. *semierectus* (L.) Hassl. is the form with broad leaflets. Illustrated, Degener, Fl. Hawaii.

Ica: Guadalupe and Ica, in fields, *Raimondi*.—Libertad: Valle de Chicama, *Raimondi*. Native to warm America; widely dispersed.

Phaseolus latidenticulatus Harms, Notizbl. Bot. Gart. Berlin 7: 504. 1921; 674.

Sparsely pilose or glabrescent vine similar to *P. appendiculatus* but the calyx broad and shallow, 5–6 mm. long, to 7 mm. broad; banner to 25 mm. long, apically reflexed, medially curved, the keel nearly 3.5 cm. long, very broad but beaked; ovary subsericeously pubescent, the style bearded at tip; young pods 7 cm. long, 3 mm. broad.—F.M. Neg. 2438.

Piura: Prov. Ayavaca, 900 meters, *Weberbauer 6427*, type.

Phaseolus linearis HBK. Nov. Gen. & Sp. 6: 445. 1823; 701.

Nearly *P. adenanthus;* stems becoming woody below; leaflets linear, obtuse or acute, rather rigid, 4–10 cm. long, 5–15 mm. wide; calyx campanulate, the tube 4 mm. long, 4-toothed, the 3 lower teeth long-acuminate, nearly 8 mm. long; petals dark violet, the banner 2.5 cm. long; pods glabrous, 6–9 cm. long, 5 mm. broad.—F.M. Neg. 2439.

San Martín: Tarapoto, *Spruce 4498; Williams 5898; 7672.* Trinidad to Paraguay.

Phaseolus longipedunculatus Mart. ex Benth. Ann. Naturh. Hofmus. Wien 2: 141. 1838.

More or less villous pubescent and perhaps to be included in *P. atropurpureus* but the leaflets commonly green, irregularly hastate or lance-ovate, the calyces rarely 4 mm. long with 5 acute teeth all much shorter than the tube; banner 12–14 mm. long, broadly obovate, bilobed, the larger wings with slender claws, the keel to 10 mm. long, finally with one complete spiral; pods linear, acuminate, 5–6 cm. long, 2–3 mm. broad, the oblong lustrous seeds 2 mm. long. —Bractlets a few mm. long are present at very base of the long slender peduncles.

Piura: Parinas Valley, *Haught 162*(?). La Brea, *Haught 35.* Central America to Paraguay.

Phaseolus lunatus L. Sp. Pl. 724. 1753; 694.

Soon glabrescent herbaceous perennial variable in habit but typically twining with broadly ovate-rhomboid to narrowly ovate acuminate leaflets and laxly flowered racemes that are shorter than the leaves, the greenish-white flowers well-pediceled, 1–1.5 cm. long; bractlets minute; calyces 3–4 mm. long, the teeth much shorter than the tube, the upper one truncate, the lateral deltoid, the lowest one triangular, acute; pods typically 4–7 cm. long, the upper

margin recurved, the lower broadly rounded; seeds highly variable in form and color.—The pods are as diverse in shape and size as the seeds. Sometimes the leaflets are nearly linear.

San Martín: Near Tarapoto, *Williams 6864*.—Junín: La Merced, *5285*.—Loreto: Yurimaguas, in field, *Williams 5366*. Nanay, *Williams 337*.—Arequipa: Near Arequipa, *Meyen*.—Cuzco: Paucartambo, *Vargas 125*. Santa Ana, *Cook & Gilbert 1601*. Naturalized in all warm regions. "Harhui," "porrotos," "avitas proto," "pallar" (C. & G.).

Phaseolus megatylus Piper, Contr. U. S. Nat. Herb. 22: 675. 1926.

Lignescent, the twining terete stems pubescent with short spreading trichomes; stipules broadly oblanceolate, obtuse, 5 mm. long; petioles shorter than the leaflets, these membranous, ovate, the lateral very oblique, acuminate and long-apiculate, rounded or subcordate at base, densely and softly pubescent both sides, 6–8 cm. long; peduncles stout, to 2.5 dm. long, the nodes conspicuous, the pedicels about as long as the calyces; bractlets oval, one-third as long as the calyx, this campanulate, pubescent, 10 mm. long, the broad upper lobe notched, the 2 lower teeth obliquely ovate, obtuse, shorter than the tube, this equaled by the triangular acute medial tooth; flowers 3 cm. long, the keel in one nearly complete loose spiral, the globular stigma on the ventral side at the tip encircled at base by a ring of hairs, below these a glabrous interspace, the style itself then densely bearded for 2 mm.; pods (immature) appressed pubescent to 14 cm. long, the straight beak 1.5 cm. long.

Cuzco: Santa Ana, 900 meters, *Cook & Gilbert 1634*, type.—Apurímac: Apurímac Valley, *Herrera 3052*.

Phaseolus pachyrrhizoides Harms, Notizbl. Bot. Gart. Berlin 7: 504. 1921; 700.

Nearly *P. Augusti* but the leaflets unless in age more densely pilose beneath, the lateral very unsymmetrical, some sublobed laterally, the stipules lanceolate, 3–4 mm. long, the bracts lance-acuminate, 10–14 mm. long, the pedicels 4–5 mm. long, the bractlets and calyx tube about as long; calyx pilose, the lower tooth and tube subequal.—Piper wrote the name with one "r."

My *3413*, which matches closely in foliage *3442*, has lignescent stems, sparsely puberulent apiculate pods 6–8 cm. long, about 1.5 cm. broad, with several compressed blackish (or early brown-

mottled) seeds 11 mm. long, 7 mm. wide, the hilum short. F.M. Neg. 2440.

Junín: Huacapistana, 1,700 meters, *Weberbauer 1769*, type. Between Palca and Carpapata, 2,900 meters, *Goodspeed 10968* (distr. as *P. bolivianus*); *Killip & Smith 24378* (det. Killip).—Huánuco: Cani, *3442* (det. Piper); *3413* (distr. as *P. bolivianus*).

Phaseolus peduncularis HBK. Nov. Gen. & Sp. 6: 447. 1824; 674.

Allied to *P. appendiculatus* but with notably smaller flowers and membranous, glabrous or glabrate leaflets often only 3–4 cm. long, about half as broad, rather gradually but scarcely acutely acuminate; peduncles typically 1.5–2 dm. long, the few flowers subsessile; calyces 3–4 mm. long, broadly campanulate, the upper teeth truncate, the lower acutish, shorter than the tube; flowers 10–15 (20) mm. long, the banner longer than broad, the keel sigmoid in anthesis; pods linear, straight, erect at maturity, 4–8 cm. long, 3.5–5 mm. broad, glabrous or lightly appressed strigillose, many-seeded.—The var. *clitorioides* (Mart.) Hassl. has somewhat firmer leaflets, the peduncles shorter. Flowers white and dark lilac.

Piura: East of Cabo Blanco, *Haught 176; 263*.—San Martín: Tarapoto, *Williams 6504; 6748*.—Loreto: Yurimaguas, *Williams 3909; 3979*. Near Iquitos, *Williams 359; Klug 1235; Killip & Smith 27226*. Río Putumayo, *Klug 1649*. Colombia to Paraguay, Brazil and elsewhere in the tropics.

Phaseolus pilosus HBK. Nov. Gen. & Sp. 6: 453. 1824; 678. *P. lasiocarpus* Mart. ex Benth. Ann. Naturh. Hofmus. Wien 2: 140. 1838. *P. hirsutus* Mart. ex Benth. l.c.

Conspicuously yellowish or rusty pubescent herbaceous vine, the trichomes reflexed-spreading, the leaflets sometimes glabrous above; stipules adnate or shortly produced basally, 6 mm. long; leaflets obliquely ovate, sometimes lobulate, rounded or acutish at tip, broadly cuneate to the obtuse or rounded base, commonly 6 or 7 cm. long, 4–5 cm. wide; peduncles 1–1.5 dm. long, shortly floriferous at apex, the flowers greenish-yellow or yellow, the bracts and bractlets subulate, caducous; calyx pubescent, campanulate, the upper tooth rounded, bidentate, the lower 3 about as long as the tube, this 5 mm. long; banner bilobed, 3 mm. long, the keel forming one complete coil; pods linear, 5–7 cm. long, 7 mm. broad, densely brown pilose with several compressed lustrous black seeds 3–4 mm. long.—Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 49*.

Libertad: Chicama Valley, *Smyth 42* (det. Killip). Central America to Trinidad; Brazil; Paraguay.

Phaseolus polytylus Harms, Notizbl. Bot. Gart. Berlin 7: 505. 1921.

Coarse climber, the stems and petioles (these 8–10 cm. long) sparsely hirsutulous or glabrate; leaflets subrhomboid-ovate, the lateral oblique, barely acute, rounded at base, minutely and sparsely strigillose above, shortly and laxly pilose-hirsute beneath, to 11 cm. long, 8.5 cm. wide; inflorescence 2.5 dm. long or longer, closely and prominently nodose above the middle; calyces subsessile, cupulate, pubescent, to 12 mm. long, the broad upper tooth subentire, the ovate lateral obtusish, the lower about as long, oblong-ovate, 6–7 mm. long; banner slightly clawed, broadly emarginate, strongly reflexed below the middle, nearly 3 cm. long and broad, the wings about a half cm. longer, the curved keel forming only a semicircle; ovary linear, villous, the style bearded apically.—F.M. Neg. 2444.

Río Acre: *Ule 9464*, type.

Phaseolus revolutus Piper, Contr. U. S. Nat. Herb. 22: 697. 1926.

Stems slender, minutely puberulent; stipules ovate, acute, 3 mm. long; petioles glabrous, shorter than the leaflets, the latter linear, obtuse but shortly apiculate, glabrous, marginally revolute, 5–7 cm. long, 4 mm. wide, the midnerve with a narrow flange-like margin its whole length; peduncles elongate, puberulent, with 5–8 flowers, the bracts and bractlets minute; pedicels 1–3 times as long as the calyces, these campanulate, 5 mm. long, the upper lobe emarginate, the lower teeth ovate, obtuse, about half as long as the tube; flowers 12 mm. long, the banner clawed, orbicular, reflexing below the middle and auricled, the oblanceolate clawed wings shortly lobed; keel narrowly clawed forming 2 complete close coils.—Section *Euphaseolus*.

Type at Paris said to originate from herb. of Pavón and according to the author "it is probable that the specimen is from Peru." However, without other data it could as well be from Mexico or Chile.

Peru(?): Cf. note above.

Phaseolus vulgaris L. Sp. Pl. 723. 1753.

Characteristically a subglabrous twining annual much like *P. lunatus* but the bractlets to 6 mm. long, equaling or longer than the

calyces; flowers variously colored; pods oblong-linear, the upper margins straight or slightly recurved, ordinarily a dm. long or longer, with 4–6 seeds.—The common bean called "bush" or "kidney."

Huánuco: Mito, *1539; 1540*, both cultivated. Huertas, naturalized, *1340*. Muña, on shrubs, *3947* (det. Piper). Near Pozuzo, commonly cultivated, *4774*.—Loreto: Río Itaya, cultivated, *Williams 3358*.—Cuzco: Marcapata Valley, 2,200 meters, in shrubwood, *Weberbauer 7874*. Cosmopolitan in warm regions at least as an escape. "Poroto," "chancha."

24. ERYTHRINA L.

Reference: Krukoff, Brittonia 3: 205–337. 1939; Amer. Journ. Bot. 28: 683–691. 1941.

Usually trees or shrubs, the branches or petioles commonly prickly, the leaves often lacking at time of flowering. Stipules small, caducous, the stipels gland-like. Leaves pinnately 3-foliate, the leaflets entire, the terminal one usually much larger. Flowers conspicuous, borne in axillary and terminal fascicles or pseudoracemes, the bracts and bractlets small. Calyx spathaceous, campanulate or tubular, truncate or 5-dentate, sometimes cleft or lobed. Banner large, unappendaged, longer than the wings and keel, the former sometimes wanting, the keel petals free or coherent. Vexillar stamen free above the middle, the anthers uniform. Ovary stiped, usually many-ovulate, the slender style glabrous at least distally, with capitate stigma. Pod linear, compressed to cylindric, not at all to strongly constricted between the seeds (these one to many), often contorted at maturity when dehiscent irregularly or simply by the ventral suture. Seeds ellipsoid, most often marked with red, the lateral hylum elliptic to oblong.

Erythroidine and other alkaloids with the characteristics of the curare arrow poisons (cf. note in this work 2: 680) have recently been isolated; cf. Krukoff, l.c. 337, and Amer. Journ. Bot. 28: 691. 1941, for bibliography.

Ruiz and Pavón referred in their journal to several collections under unpublished names, remarking their great beauty in flower. The one they collected at Lurín and referred to *E. coralodendron* L., a species of the West Indies, might be *E. edulis;* they noted the pods as eaten when green, but somewhat bitter, the thick trunks used for straight posts, being propagated for that purpose from cuttings. The native names, "huayro" and "huayruru," were recorded by Tessmann as "uayrucu" for *E. peruviana.*

Species of *Erythrina* are commonly planted for shade in coffee and cacao plantations; besides the native names they are sometimes known as "bois immortelle," and at least in Colombia appropriately as "madre de cacao."

Besides the following, *E. speciosa* Andr. was found by Wawra cultivated at Lima. This small tree of southern Brazil is spiny, leafy at anthesis, the flowers like those of *E. edulis* but the keel petals and wings auricled toward base, the seeds soot-colored marked with brown. Another species planted for ornament in the tropics and probably in Peru is *E. velutina* Willd., well-marked by its spathe-like calyx, the leaflets stellate-pubescent beneath, the seeds red, a combination of characters unique in the genus. It is known wild as near as Ecuador and the Galapagos Islands. The flowers and calyces of both of these species as well as those of the Peruvian *E. glauca, E. falcata, E. Ulei* are illustrated, Amer. Journ. Bot. 28: 684, 686. My account follows Krukoff's excellent revision.

Key (after Krukoff)

Banner subrotund-rhombic with stipe 9 mm. or longer; seeds opaque, umber to blackish and marked with black. . . *E. glauca.*

Banner and seeds otherwise.

Wings less than three-fourths the length of the keel petals; seeds never red even in part.

Wings to one-third the length of keel petals, these three-fourths as long as or equaling banner; seeds black with tawny markings or if concolored, 10–17 mm. long.

Leaflets soon glabrous, the terminal narrowly elliptic; pods ligneous, not follicular. . . . . *E. crista-galli, E. falcata.*

Leaflets tomentose or glabrous but usually broader than elliptic, less than twice as long as broad; pods chartaceous, follicular.

Pedicels 5–12 mm. long; finely tomentulose. *E. Poeppigiana.*

Pedicels 1.5–6 cm. long, glabrous or soon glabrescent.

Leaflets glabrous at maturity. . . . . *E. Ulei.*

Leaflets somewhat pubescent beneath on nerves. *E. verna.*

Wings less than three-fourths the length of keel petals, these less than two-thirds as long as banner; seeds dark brown, concolored, 25–34 mm. long. . . . . *E. edulis.*

Wings at least three-fourths the length of the keel petals to longer than these; seeds red at least in part.

Keel petals separate.

Calyx 5-dentate, the teeth 3–6 mm. long.....*E. peruviana.*

Calyx entire or nearly except for the blunt tooth on upper side.....*E. amazonica.*

Keel petals connate.....*E. rubrinervia.*

Erythrina amazonica Krukoff, Brittonia 3: 270. 1939.

Shrub or tree, more or less leafy at anthesis and usually spiny, the branchlets stout; petioles elongate, early pubescent as the petiolules, these 4.5–12 mm. long; leaflets chartaceous, at first softly villous becoming glabrous, not ceriferous, the terminal usually rhombic-ovate, long-acuminate (acumen to 6 cm. long), rounded or truncate at base, mostly 1–2.5 dm. long, 6.5–16 cm. broad; rachis and pedicels pubescent with spreading trichomes, the pedicels 4–10 mm. long; calyx chartaceous, campanulate, 1–2 cm. long, 7–11 mm. broad at apex, the blunt tooth to 4.5 mm. long; banner red, 4.4–8.6 cm. long, cuneate at base, the wings 9–17 mm. long, the rounded keel petals 8–14.5 mm. long, apiculate dorsally at tip; ovary densely pubescent; pods subligneous, 14–16 cm. long, deeply constricted between the many seeds, the stipe 3–4.5 cm. long, the acumen to 3 cm. long.—To 10 meters high.

Loreto: Soledad, *Tessmann 5239*, type. Brazil. "Mulungú," "huamanstillo."

Erythrina crista-galli L. Mant. 99: 1767; 228.

Much like *E. falcata* but the leaves often reticulately ceriferous beneath, inflorescence terminal and leafy (or the flowers axillary) instead of lateral and leafless and the stamens distinct only for 3–7 mm. instead of 9–18 mm.; pods 12–15 mm. broad; seeds 5–8 mm. wide, twice or more as long as broad, with short funicle.—Known in Peru only from several cultivated collections. Illustrated, Bot. Mag. 140: *pl. 8532;* Rock, Leg. Pl. Hawaii., *pl. 78.*

Lima: *Martinet* and others. Southern South America.

Erythrina edulis Triana ex Micheli, Journ. de Bot. 6: 145. 1892; 248. *E. Lorenoi* Macbr. Field Mus. Bot. 8: 104. 1930. *E. esculenta* Sprague, Bull. Herb. Boiss. sér. 2. 5: 1167. 1905. *E. megistophylla* Diels, Bibl. Bot. 116: 96. 1937.

Medium-sized tree, leafy at anthesis, the rather slender branchlets as the long petioles sometimes aculeate; petiolules 3–17 mm. long; leaflets chartaceous or subcoriaceous, occasionally aculeate above, glabrous or the principal veins beneath puberulent as at first the flower-rachis and pedicels; terminal leaflets usually ovate to broadly ovate or elliptic to subrotund, acute to acuminate, rounded or truncate to cuneate at base, commonly 1–2 dm. long, 5–15 cm. broad; pedicels 3–8 mm. long; calyx chartaceous, broadly campanulate, about 1 cm. long, 8–10 mm. broad apically, irregularly lobed, often keeled above; banner broadly elliptic, 2–3 cm. long, the wings 3–6.5 (10) mm. long, the often lobed keeled petals 1–2 cm. long; pods subligneous, usually 1.5–2.5 dm. long, about 2 cm. broad, constricted between the seeds, the acumen about 2 cm. long, rigid.

Related Andean species include *E. polychaeta* Harms, 246, and *E. Schimpffii* Diels, 247, both of Ecuador; the former is densely setose-aculeate, the latter has leaflets minutely cirriferous beneath, the elongate banner narrow.

Fruit is edible boiled or fried and, according to Vargas, "agradable."

Cajamarca: Socota, *Stork & Horton 10150.*—Ancash: Pucha, *Weberbauer 3299;* 173 (as *E. breviflora?*).—Huánuco: Río Chinchao Valley, 1,300 meters, *Stork & Horton 9851.* Muña, *3956.*—Junín: *Killip & Smith 25840.*—Ayacucho: Aina, *Killip & Smith 22827.* —Apurímac: Near Abancay, 2,400 meters, *Vargas 484.* Pincos, *Stork & Horton 10705.*—Cuzco: Valle de San Miguel, *Herrera 2021* (type, *E. Lorenoi*); (*Bingham 733; Cook & Gilbert 1178; 1751*). Bolivia to Colombia. "Poroto," "anteporoto," "pisonay," "pajurro," "pashigua."

Erythrina falcata Benth. in Mart. Fl. Bras. 15, pt. 1: 172. 1859; 232. *E. Martii* Colla, Herb. Pedem. 2: 250. 1834?

Large usually armed tree leafy at anthesis, the growing parts more or less puberulent but soon glabrescent or glabrous; branchlets sometimes aculeate as also the petioles, the petiolules 6–12 mm. long; leaflets chartaceous, the terminal narrowly elliptic to elliptic-obovate, acute to obtuse or rounded both ends, 5–16 (21) cm. long, about half as wide; rachis 8–37 cm. long; pedicels 6–25 mm. long; calyx chartaceous, broadly campanulate, 7–20 mm. long, 11–18 mm. broad at tip, entire or bilobed or lacerated; banner red, broadly elliptic-ovate, 2.8–4 (5.5) cm. long, the claw to 4 mm. long; wings usually toothed toward base, 7–14 mm. long, the falcate keel petals

30–47 mm. long; pods ligneous, 9.5–25 cm. long, 2–3 cm. wide, shallowly if at all constricted between the black tawnily marked seeds (these 12–13 mm. long with funicle to 3–5 mm. long), the rigid acumen a little more than a cm. long.—Krukoff has shown that in all probability the name of Colla antedates that of Bentham. According to the monographer the species is vigorous up to 2,000 meters in Peru and Bolivia; in the latter country, in Sorota, it is a favorite shade tree. F.M. Neg. 6301.

Cuzco: Valle del Urubamba, 3,000 meters, *Herrera 1063; Cook & Gilbert 832.* To southern Brazil. "Pisonay," "pisnay."

Erythrina glauca Willd. Ges. Naturf. Freund. Berlin Neue Schr. 3: 428. 1801; 224.

Short-trunked tree, armed, leafy at anthesis, the stout branchlets often aculeate; petioles and petiolules glabrous or nearly, the latter 4–13 mm. long, the glabrous coriaceous blades pale green above, distinctly paler beneath; terminal leaflet ovate to elliptic, rounded to acute both ends or truncate at base, 7.5–15 (19) mm. long, about half as broad; rachis 1–3 dm. long, the pedicels 5–19 mm. long; calyx chartaceous, broadly campanulate, 10–17 mm. long, 15–19 mm. broad near apex, entire or nearly but variously lacerate just before anthesis; banner orange, roundish, 4.7–6.8 cm. long including claw, this 9–21 mm. long; wings 22–33 mm. long, the ovate-falcate keel-petals 2.5–3.5 cm. long; pods ligneous, to 3 dm. long, about 1.5 cm. wide, slightly constricted between the seeds, these 12–18 mm. long, opaque, black-mottled.—Illustrated, Huber, Arbor. Amaz. 1: *pl. 24.* F.M. Neg. 2372.

Loreto: Caballo-Cocha and La Victoria, *Williams 1614; 1960; 2314; 3142.* Puritania and vicinity of Iquitos, *Tessmann 3089; 3739; 5328.* West Indies; Guatemala to Brazil and Bolivia. "Amasisa."

Erythrina peruviana Krukoff, Brittonia 3: 262. 1939.

Tree, leafless at anthesis; rachis, pedicels, and calyces more or less pubescent with rather long deciduous trichomes, the first to 3 dm. long, the second 4–10 mm. long, the third 10–21 mm. long, this (the calyx) thin-chartaceous, campanulate, 8–11 mm. broad near apex, 5-dentate, the upper tooth stout, blunt, 5–6 mm. long, the remaining teeth slender, acutish, 3–5 mm. long; banner rose-red, usually narrowly lanceolate-elliptic, 4.5–7 cm. long; wings 9–11 mm. long, to 6 mm. wide, the keel-petals 7.–8.5 mm. long; ovary densely pubescent.—Leaves and fruits unknown. To 12 meters high.

Loreto: Mouth of the Santiago, *Tessmann 4322.* "Uayrucu."

Erythrina Poeppigiana (Walp.) O. F. Cook, Bull. U. S. Dept. Agr. Bot. 25: 57. 1901; 235. *Micropteryx Poeppigiana* Walp. Linnaea 23: 740. 1850. *E. amasisa* Spruce, Journ. Linn. Soc. Bot. 3: 202. 1859. *E. micropteryx* Poepp. ex Urban, Symb. Ant. 1: 327. 1899.

Becoming a very large tree, armed, the stout branchlets aculeate; petioles and petiolules glabrous or puberulent, the latter 5–16 mm. long; leaflets thin-chartaceous, usually scabrous beneath, only at first puberulent, the terminal rhombic- or deltoid-ovate to roundish, shortly acuminate or obtuse, rounded to truncate, rarely cuneate at base, 5–18 (24) cm. long, 5.5–16 (24) cm. broad; rachis and pedicels puberulent, the latter 5–12 mm. long; calyx chartaceous, campanulate, 5.5–10 mm. long both sides, 5–8 mm. broad, entire, the keel on the upper side 2 mm. long; banner bright orange, 5–5.4 cm. long, including claw, this 1–5 mm. long; wings 7–14 mm. long, the falcate keel-petals 2–4.5 cm. long; ovary finely puberulent; pods chartaceous, to 2.5 dm. long, 1.1–1.4 cm. broad with acumination 4–8 mm. long, not at all constricted between the usually many seeds, these uniformly coffee-brown, 10–17 mm. long.—This is one of the trees commonly planted as shade for coffee and cacao. Illustrated, Addisonia 10: *pl. 331*. F.M. Neg. 2373.

Subandean Peru: *Poeppig*, type.—San Martín: Tarapoto, *Ule 6319; Belshaw 3254; Spruce 4069* (type, *E. amasisa*). Moyobamba, 860 meters, (Weberbauer, 288).—Huánuco: Monzón, *Weberbauer 3469;* 285.—Loreto: Balsapuerto, *Klug 3038*. Pampa del Sacramento, (*Huber?*).—Cuzco: Valle de Santa Ana, 1,600 meters, *Herrera 3613*.—Río Acre: *Krukoff 5557*. Panama to Bolivia and adjacent Brazil. "Amasisa."

Erythrina rubrinervia HBK. Nov. Gen. & Sp. 6: 434. 1824; 307.

Shrub or becoming a small tree, usually armed, the stout ordinarily aculeate branchlets leafy at anthesis; foliage soon glabrous, the petiolules 4.5–10 mm. long, the chartaceous leaflets minutely reticulate-ceriferous beneath; terminal leaflets rhombic-ovate, acuminate, typically cuneate at base, 9.5–20 cm. long, 5–12 cm. broad; rachis and pedicels shortly pubescent, the latter 3–9 mm. long; calyx thin-chartaceous, tubular-campanulate, 10–30 mm. long, 4–7 mm. broad near tip, usually entire, pointed on the keel side by a tooth 1.5–2 mm. long, [illegible] glabrous; banner scarlet, narrowly oblanceolate, 4.4–7.6 cm. long; wings usually irregularly toothed apically, usually slightly smaller than keel-petals, 5.5–12 mm. long,

3.5–5 mm. broad; pods subligneous, 2–3.5 dm. long, about 1–5 cm. broad, with acumen 3–6 dm. long, deeply constricted between the many seeds, these uniformly scarlet, 10–12 mm. long.—*E. Smithiana* Krukoff, 323, known from as near as southern Ecuador, has subcoriaceous calyx, subequal both sides, truncate. F.M. Neg. 37501.

Huánuco: Pozuzo, *Ruiz & Pavón.*—Puno: Chunchosmayo, *Weberbauer 1349.* Colombia to Bolivia. "Haymura."

Erythrina Ulei Harms, Verh. Bot. Ver. Brandenb. 48: 172. 1907; 238. *E. xinguensis* Ducke, Archiv. Jard. Bot. Rio Jan. 3: 167. 1922.

Armed large tree, leafless or only with young leaves at anthesis, the rather slender branchlets aculeate; petiolules soon glabrous, 6–11 mm. long, the chartaceous leaflets often scabrous below near base, early puberulent, the terminal obovate, elliptic or ovate, rounded or retuse at apex, usually cuneate or acute at base, 11–14 cm. long, 8–11 cm. broad; rachis often scabrous, puberulent to glabrous; pedicels 2.2–6 cm. long; calyx chartaceous, broadly campanulate, equal both sides, 6–14 mm. long, 8–12 mm. broad at tip, the calyx being stretched transversely at anthesis, entire or nearly keeled above, with spur to 2.3 mm. long, glabrous; banner red, elliptic, about 3.5–4 cm. long including the claw, this to 3 mm. long; wings 3–12 mm. long, the falcate keel-petals 3–4 cm. long; pods chartaceous, to 2.5 dm. long, the acumen 4–8 mm. long, not at all constricted between the 1 to 3 seeds, these uniformly coffee-brown in color, 13–14 mm. long.—F.M. Negs. 2376; 2379 (*E. xinguensis*).

Junín: Chanchamayo, (*Raimondi*, det. Harms).—Loreto: Yurimaguas, *Ule 6300*, type; *Williams 4767; 4996.* Vicinity of Ucayali, *Tessmann 3123; 3740.*—Puno: Chunchosmayo, Sandía, 1,000 meters, *Weberbauer 1249;* 279. Without locality, *Pavón.* Bolivia and Amazonian Brazil. "Amasisa," "huilcatauri."

Erythrina verna Vell. Fl. Flum. 304. 1825; 240. *E. Mulungu* Mart. ex Benth. in Mart. Fl. Bras. 15, pt. 1: 173. 1859.

Large armed tree, the leaves developing after the flowers, the branchlets aculeate; petiolules 5–14 mm. long; leaflets chartaceous, sparsely tomentose, glabrescent, trichomes usually persisting on nerves, the terminal leaflet subrotund to broadly ovate, acute to rounded at tip, truncate to subcordate at base, 7–24 cm. long, 6.5–25 cm. broad; rachis early pubescent with spreading trichomes, the soon glabrate pedicels 1.5–4 cm. long; calyx chartaceous, broadly

campanulate, equal both sides, 6–10 mm. long, 8–14 mm. broad at tip, entire or nearly, often keeled with spur to 0.7 mm. long; banner red, broadly elliptic, 3 to nearly 5 cm. long including the claw, this to 3 mm. long; wings 6–14 mm. long, the broadly falcate keel-petals 3–4 cm. long; fruits and seeds unknown.—*E. flammea* Herzog, Repert. Nov. Sp. 7: 57. 1909; 242, of Bolivia and Brazil, similar, has subcoriaceous leaflets that with the petioles are densely tomentose beneath, the keel-petals 4.5–5.5 mm. broad (7–11 mm. in *E. verna*); pods chartaceous, about 11 cm. long with acumen about 5 mm. long, not constricted between the 1 or 2 seeds, these blackish brown, indistinctly tawny marked, 12 mm. long.—Illustrated, Vell. Fl. Flum. Ic. 7: *pl. 102.*

Río Acre: *Ule 9408; 9468; Krukoff 5334.* Brazil. "Mulungú."

25. MUCUNA Adans.

Negretia R. & P. Syst. 176. 1798.

More or less woody vines, at least the pod-pubescence irritating, the 3-foliate leaves with usually inequilateral leaflets provided with stipules. Flowers large in long-peduncled axillary racemes. Calyx-teeth very unequal, the upper completely connate. Banner complicate, more or less inflexed-auricled at base, usually much shorter than the incurved wings, these equaled or exceeded by the keel. Stamens 10, only the vexillar free; anthers alternately longer and shorter, the latter versatile, often bearded. Style glabrous. Pods thick, linear to broadly oblong, bivalved, usually densely bristly and often variously ridged or lamellate. Seeds few, orbiculate or transversely oblong, compressed, exarillate.

Besides the following *M. mitis* (R. & P.) DC. Prodr. 2: 405. 1825 (*N. mitis* R. & P.) from "Chinchao, Macora, Mesapata, leaflets obliquely ovate, racemes greatly elongate, pods unarmed, seeds somewhat compressed" has been described from Peru; the name probably must be dropped as its application is entirely obscure; it could be a *Dioclea.*

Ruiz & Pavón have explained the common name of the natives, "llamapañaui," as "eye of llama," on account of the shape of the seeds; reduced to powder these are divided into two parts, one applied to bite of reptiles and insects, the other (about a dram) drunk with water as an excellent antidote. In some places the name is "picapica," on account of the little bristles which, entering the skin, cause pain or inconvenience; several persons assured us that

these taken with chocolate-milk or honey and water are an excellent anthelmintic (Ruiz & Pavón).

Leaflets lustrous-silvery appressed sericeous beneath; flowers yellow. *M. Sloanei.*

Leaflets pubescent to glabrate beneath.

Flowers umbellate or the inflorescence so shortened that they appear so.

Leaflets softly pubescent beneath..... *M. elliptica.*

Leaflets sparsely or finely pubescent beneath..... *M. Huberi.*

Flowers racemose.

Plants more or less pubescent; banner short..... *M. rostrata.*

Plants glabrous or glabrate; banner nearly as long as the wings. *M. urens.*

Mucuna elliptica (R. & P.) DC. Prodr. 2: 405. 1825. *Negretia elliptica* R. & P. Syst. 176. 1798. *N. inflexa* R. & P. l.c. *N. platycarpa* R. & P. l.c. 178. *M. inflexa* (R. & P.) DC. Prodr. 2: 405. 1825. *M. platycarpa* (R. & P.) DC. l.c. 406.

High-climbing, the upper stems or branches, peduncles, petioles and leaves beneath densely villous or pilose with more or less appressed rusty trichomes; leaflets broadly ovate-elliptic or the terminal one subrotund, rounded or shortly cuneate at base, the lateral usually strongly oblique, shortly and abruptly acuminate, glabrate above, the larger 1.5 dm. wide; peduncles short or elongate, more or less enlarged apically to a knob-like receptacle on which are borne several flowers; receptacle surrounded by broad bracts more or less promptly caducous or apparently the bracts may be at least in part narrow and may persist; calyces appressed pilose, about 1.5 cm. wide, the upper lobe very broad, the lower teeth narrow, subequal, the lowest more than half as long as the tube; flowers 6–7 cm. long, the banner about two-thirds as long as the wings; pods 2-seeded (exceptionally 1-seeded), shortly pediceled or subsessile, not plaited, broadly oblong, subcompressed, lightly or scarcely ridged at margins, often 10 cm. long, half as wide, densely dark brown tomentose and bristly, the bristles caducous; seeds subcompressed, convex, 3 cm. broad, nearly surrounded by the narrow hilum, this 5–6 mm. wide.

The determination of the following material, except as to my collection in fruit, is open to question as none of the other specimens (although in flower) show type of inflorescence. *M. Fawcettii* Urban, Symb. Ant. 5: 371. 1908, of Jamaica has similar inflorescence, the

yellow flowers borne like those of *M. elliptica*, but the hilum is broader. The inadequate original descriptions or material of the two Ruiz & Pavón species listed above point to their association here, especially in the case of *M. inflexa* except that the seed is said to be "subglobose"; the authors' delineation of *M. platycarpa* runs, "leaflets cordate-ovate, intermediate oblong-linear-ovate, pods compressed, seeds flat. Cuchero, Pueblo Nuevo, Chicoplaya." *M. inflexa* was recorded by Ruiz & Pavón as from Cuchero, Pozuzo, Muña; as also *M. elliptica*. F.M. Negs. 28191; 28192 (*M. inflexa*).

San Martín: Near Moyobamba, *Klug 3367* (det. Standl., *M. mapirensis*).—Huánuco: Pozuzo, Cuchero and Muña, *Ruiz & Pavón*, type. Pampayacu, *Kanehira 217*. Pozuzo, *4651*.—Junín: La Merced, *5464*.—Ayacucho: Aína, *Killip & Smith 22747*. Río Apurímac, *Killip & Smith 23045*.—Loreto: San Isidro, *Tessmann 4973* (det. Harms, *M. Huberi*, var.). "Llamapañaui."

Mucuna Huberi Ducke, Archiv. Jard. Bot. Rio Jan. 4: 90. 1925.

Resembles, according to the author, *M. rostrata* in leaves, indument and calyx but differs in dimensions and color of flowers, these yellow, few on a thick erect peduncle 3–8 cm. long, the pedicels 1–2 cm. long, stout; banner 4–5.5 cm. long, the wings 7.5–9 cm. long, the keel slightly longer.—The showy flowers are borne together as in *M. elliptica* and if the following collection in fruit is correctly referred here the pods are similar. The type was based on a cultivated specimen but the species has since been found on the upper Amazon near Peru. F.M. Neg. 2380.

Loreto: Lower Río Huallaga, *Killip & Smith 28999*. Brazil.

Mucuna rostrata Benth. in Mart. Fl. Bras. 15, pt. 1: 171. 1859.

Stems and petioles glabrate as also the leaves or these minutely and usually sparsely (unless beneath) strigillose; leaflets ovate- or oblong-elliptic, the lateral oblique, commonly 10 cm. long, 6–7 cm. wide, shortly caudate-acuminate; racemes shorter than the leaves, the rachis as the broadly campanulate calyces fulvous sericeous or the latter also somewhat bristly; lower calyx tooth narrow, about as long as tube; pedicels 6–10 mm. long; banner about one-third shorter than the petals, these as the longer acutely beaked keel 5 cm. long or longer; alternate anthers barbed at base; ovary few-ovuled; pods unknown.—Flowers orange to scarlet in pendent racemes.

The description of *M. inflexa* suggests that it may in part have been this; see remarks under *M. elliptica*. **M. mapirensis** (Rusby)

Macbr., comb. nov. (*Stizolobium mapirense* Rusby, Mem. Torrey Club 6: 25. 1896), Bolivian, has leaflets densely pilose on the nerves beneath, sparsely on the veins, the racemes short.

Huánuco: Pozuzo, *4650.*—Junín: La Merced, *5572.*—San Martín: Near Moyobamba, flowers brick red, *Klug 3649.*—Loreto: Pebas, *Williams 1857.* Upper Río Nanay, *Williams 1200.* Near Iquitos, *Williams 1441.* La Victoria, *Williams 3024.* Caballo-Cocha, *Williams 2424.* Balsapuerto, flowers orange, *Klug 3083* (distr. as *M. Huberi*).—Cuzco: Valley of Sambray, flowers bright scarlet, *Mexia 8037* (det. Killip). Río Tambomayo, 1,200 meters, flowers vivid red-orange, *West 7116* (det. Johnst.). Río Chaupinmayo, *Soukup 586.* Colpani, *Cook & Gilbert 1055.* Ecuador; Brazil; Bolivia. "Aguacenqua," "ancacjsillon" (C. & G.), "ahuacincca" (C. & G.).

Mucuna Sloanei Fawc. & Rendle, Journ. Bot. 55: 36. 1917.

Stems soon suffrutescent, the uppermost and petioles only lightly hispid but the leaflets lustrous beneath with an appressed indument of short grayish sericeous trichomes; leaflets the usual shape and size for the genus; peduncles as long or much longer than the petioles, bearing apically and subumbellately several yellow flowers that are about 5 cm. long with banner about 3 cm. long; lower calyx-teeth nearly as long as tube; pods with 2 narrow ridges along each margin and with many transverse plaits, 10–15 cm. long, 4 cm. wide, bristly and tomentose, the 2–4 compressed-roundish seeds 2–3 cm. broad, nearly surrounded by the hilum.—Illustrated, Fawc. & Rendle, Fl. Jamaica 4, pt. 2: p. 53.

San Martín: Near Moyobamba, *Klug 3561.*—Loreto: Florida, *Klug 2265* (det. Killip). Tropical America and west tropical Africa. "Gose-o" (Huitoto).

Mucuna urens (L.) DC. Prodr. 2: 405. 1825. *Dolichos urens* L. Syst. ed. 10. 1162. 1759. *M. altissima* (Jacq.) DC. l.c.

Glabrous or essentially with slender greatly elongate pendulous peduncles (to 1 meter long) the blue-purple (keel yellowish) flowers 1–3 together from sessile tubercles on a zigzag rachis; petioles often a dm. long or longer; leaflets broad, abruptly acuminate; calyx about 1 cm. long and broad, pubescent, the upper tooth entire or emarginate, the lower acute, the longest intermediate one about 4 mm. long; banner 3–4 cm. long, three-fourths to nearly as long as the wings, these as keel tomentose at base; pods sessile, oblong, 1–2 dm.

long, 5 cm. broad, with many nearly transverse ridges and 2 narrow wings along one suture; seeds as many as 4, rounded but somewhat flattened, nearly or quite surrounded by the hilum, 3 cm. broad or broader.

The "sea-bean" so often picked up, brightly polished, along shores, is the seed of this vine.

Loreto: Iquitos, *Killip & Smith 27224; Klug 1499.* Brazil to the West Indies and Central America.

26. CANAVALIA Adans.

Reference: Piper, Contr. U. S. Nat. Herb. 20: 555–588. 1925.

In general like *Dioclea*, but the lower entire or trifid calyx teeth much smaller than the upper, this truncate or bilobed. Banner with or without auricles, the keel truncate or more or less beaked, sometimes spiraled at tip. Valves of the pods with 1–4 longitudinal ridges, one or more of these sometimes approximate to or even united with one or both sutures. Seeds globose to ellipsoid and compressed (the hilum linear) more or less separated within the compressed or somewhat turgid pod.—As described here includes *Wenderothia* Schlecht., which seems as Ducke remarks, Archiv. Inst. Biol. Veg. Rio Jan. 4: 24. 1938, not separable. Name originally written *Canavali*, the present spelling adopted by DeCandolle and conserved. Piper, l.c., discusses the economic properties, not important.

Technical key

Ridges 4 on each pod valve, 2 near each suture.....*C. eurycarpa.*

Ridges 2 on each valve, 1 near each suture.....*C. parviflora.*

Ridges 3, 1 or 2 near the ventral, one approximate to or united with the dorsal suture.

Pod densely villous.....*C. lasiocalyx.*

Pod puberulent or strigillose, glabrate in age.

Hilum about one-fifth circumference of seed.

Seeds 12–16 mm. long.....*C. maritima.*

Seeds 2 cm. long.....*C. Piperi.*

Hilum long, at least one-third the circumference and nearly as long as seed.

Intermediate pod rib 2–3 mm. from ventral rib.

Pod sparsely strigillose, 3 cm. broad.....*C. boliviana.*

Pod densely strigose, 18 mm. broad.....*C. peruviana.*
Intermediate pod rib 5 mm. from ventral rib..*C. brasiliensis.*

Vegetative key

Trailing or clambering plants with suborbicular leaves growing along or just back of beaches.....*C. maritima.*
Climbing plants of the interior.
Calyx and pod densely fulvous pubescent or strigose.*C. lasiocalyx.*
Calyx and pod appressed strigillose to glabrate.
Leaves glabrate or sparsely strigillose beneath; pods glabrate in age.
Leaflets acute or acuminate, shortly and bluntly.
Leaflets obliquely rounded or truncate at base.
Pod valves 4-ridged; leaves glabrous as to type; flowers unknown.....*C. eurycarpa.*
Pod valves biridged; leaves glabrous or strigillose; flowers 1.5 cm. long.....*C. parviflora.*
Pods with 1 ridge, remote from ventral suture; leaves typically more or less strigillose; flowers 2.5 cm. long. *C. brasiliensis.*
Leaflets shortly cuneate at base.....*C. boliviana.*
Leaflets obtuse or apiculate, rounded.....*C. Piperi.*
Leaves densely pilosulous beneath, especially on the nerves where the trichomes are longer.....*C. peruviana.*

Canavalia boliviana Piper, Contr. U. S. Nat. Herb. 20: 573. 1925.

Stems stout but herbaceous, sparsely strigillose puberulent as the petioles, petiolules and leaflets on both surfaces, the latter membranous, perhaps typically broadly oval or ovate to broadly deltoid, and truncate, but apparently more often shortly cuneate at base, abruptly acuminate to a short obtuse tip, 7–12 cm. long, 5–10 cm. broad with 5–6 pairs of prominent lateral nerves; peduncles many-flowered, the nodes prominent; calyx campanulate, 14 mm. long, nearly glabrous, the upper lobe shorter than the tube; flowers 4 cm. long, the keel broad, strongly curved; pod stiped, straight, plano-compressed, sparsely strigillose, 1–2 dm. long, 3 cm. broad, the intermediate rib mostly prominent and 2–3 mm. from the ventral rib; inner layer not septate; seeds flattened-ellipsoid, olive yellow

marked with brown, 15 mm. long, about half as broad, the black hilum as long.—It seems doubtful if the plant is specifically distinct from *C. brasiliensis*.

Peru (probably). Bolivia.

Canavalia brasiliensis Mart. ex Benth. Ann. Naturh. Hofmus. Wien 2: 135. 1838; 574.

Younger herbaceous, slender stems as well as petioles, petiolules and leaflets, the latter, especially beneath, sparsely strigillose as to type; leaflets ovate to oval, membranous, shortly acuminate, rounded to obtuse at base, 1–1.5 dm. long; peduncles many-flowered; calyx campanulate, 13–15 mm. long, sparsely strigillose, the upper tooth well developed; flowers purplish, 2.5 cm. long, the banner basally calloused and auricled, the keel falcate, blunt; pod nearly straight, sparsely strigillose, 1–1.5 dm. long, 2–5 cm. broad, one ridge very near the ventral suture, the second 3–5 mm. distant; inner layer papery and separating; seeds ellipsoid, 10–13 mm. long, the black hilum two-thirds as long.—Description after Piper. Ducke, Archiv. Inst. Biol. Veg. Rio Jan. 4: 24. 1938, includes here *C. amazonica* Piper, and *C. dictyota* Piper, 573, 574, both however with distinctly cuneate-based leaflets; in this case the species must be variable in foliage and placement of intermediate ridge on pod, which is more than probable. F.M. Neg. 28023.

Peru (probably). Brazil; Bolivia.

Canavalia eurycarpa Piper, Field Mus. Bot. 4: 94. 1925.

Somewhat ligneous and glabrous (as to type), the stout, fruiting stems 7 mm. thick; petiolules 6 mm. long; leaflets chartaceous, oval, the lateral oblique, rounded at base, acute, 10–12 cm. long, 7–8 cm. wide; peduncles many-flowered, the scattered nodes prominent; pods straight, ligneous, brown, stoutly stiped, with shortly recurved beak, 18 cm. long, 3–4 cm. broad, each valve longitudinally 4-ridged, one rib approximating each suture, the others more prominent, 2 mm. distant, inner layer not septate; seeds strongly compressed, brown, lustrous, 2–3 mm. long, equaled by the black hilum.—Probably, as suggested by Piper, *Clitoria brasiliana* Vell., Fl. Flum. 7: *pl. 129*, text 293. 1825, may be the earlier name, but as descriptions and plate do not entirely agree, the cognomen should be dropped.

The following collections (det. Standl. except type and *Ule*) are lightly strigillose and, only in flower, could probably better be referred to *C. brasiliensis*, but as the species cannot be separated on

calyx or characters other than fruit it is impossible to place them definitely.

San Martín: Juanjuí, *Klug 4247; 4351?* (det. Standl., cf. *C. peruviana*). Chazuta, *Klug 3993*. Near Moyobamba, *Klug 3577*.—Huánuco: Pozuzo, *4580*.—Loreto: Balsapuerto, *Klug 3007*.—Río Acre: *Ule 9454*.

Canavalia lasiocalyx Kuntze, Rev. Gen. 3, pt. 2: 55. 1898; 583. *Wendorothia lasiocalyx* (Kuntze) Piper, Contr. U. S. Nat. Herb. 20: 583. 1925. *Phaseolus vignoides* Rusby, Bull. N. Y. Bot. Gard. 4: 345. 1907, fide Killip.

More or less ligneous species well-marked in flower and fruit by a rather abundant, rusty pubescence on the stems, petioles, peduncles and calyces; leaflets ellipsoid or oval-elliptic, rounded at base, acute, sparsely puberulent both sides, sometimes densely on the prominent nerves beneath, commonly 5–8 cm. long; calyces 1 cm. long, usually marked with purple, the broad truncate upper lip shorter than the tube; flowers purple, 3 cm. long, the standard with prominent callosities, the keel narrow, curved, beaked; pods densely villous with spreading, rusty trichomes, 8–10 cm. long, 12 mm. broad, one longitudinal ridge near the ventral suture, another approximate to the dorsal suture and a third about 8 mm. distant from the latter; seeds 7 mm. long, the linear hilum nearly as long, pale brown splotched with darker brown.

Junín: La Merced, *5235* (det. Piper); *Killip & Smith 23504*.—Ayacucho: Aína, *Killip & Smith 23115*.—Cuzco: Santa Ana, *Cook & Gilbert 1611* (det. Piper). Bolivia.

Canavalia maritima (Aubl.) Thouin, Journ. Bot. Desv. 1: 80. 1813; 564. *Dolichos maritimus* Aubl. Pl. Guian. 765. 1775.

Herbaceous, silky strigillose, especially the younger parts, including the pods, the broadly ovate-orbicular leaves glabrate in age; peduncles rather remotely flowered, the rose-colored corollas 10–15 mm. long; banner auricled and with 2 lunate callosities, the keel curved, blunt, auricled at base; pods nearly straight, beaked, turgid, sparsely strigillose, 7–15 cm. long, 2–2.5 cm. broad, each valve with a rib close to each suture and a third one 3–5 mm. from the ventral suture; inner layer separating; seeds ovoid to subglobose, brown, 12–16 mm. long, the hilum much shorter.—This is a not uncommon sand-binder along tropical seas.

Piura: In dense masses back of beach, 18 km. north of Cabo-Blanco, *Haught F64*. Zorritos, *Haught 208*.

Canavalia parviflora Benth. in Mart. Fl. Bras. 15, pt. 1: 177. 1859; 563.

Liana, the glabrous stems terete; leaflets slightly coriaceous, oval to ovate, abruptly and bluntly short acuminate, rounded or truncate at base, sparsely strigillose both sides, 6–10 cm. long, 4–6 cm. broad; petiolules 5–7 mm. long, glabrous or puberulent; peduncles much shorter than the flowering portion of the inflorescence, the nodes prominent; bractlets orbiculate; calyx 10 mm. long, glabrous or sparsely strigillose, the broad upper lip emarginate, the lower tridentate; banner suborbicular, 1.5 cm. long, bicalloused and auricled, the auricles inflexed; wings and keel petals auricled, the keel blunt; mature pods ligneous, glabrous, straight, 1 dm. long, 3 cm. broad, with a short sharp incurved beak and 2 sharp ribs, 1 very close to each suture; seeds 18 mm. long, 10 mm. broad, with linear hilum nearly as long, oblong, much compressed, brown, lustrous.—Section *Diplegma*. The identification of the Killip & Smith specimen in fruit is not certain; the immature pod is 1.5 dm. long, 3.5 cm. broad.

Junín: La Merced, *Killip & Smith 23813* (cf. note above).—Río Acre: Seringal Auristella, *Ule 9455*. Southern Brazil.

Canavalia peruviana Piper, Field Mus. Bot. 4: 94. 1925.

Liana, the older brownish-red–barked stems stout, definitely woody, the younger leaf-bearing ones closely and softly pilose with short fuscous trichomes as also the petioles, petiolules and leaflets beneath, these coriaceous-chartaceous, dark green and lustrous but slightly puberulent on the veins above, paler beneath and in age pilose principally on nerves, oblong-elliptic, about 10 cm. long, half as wide; pods stoutly stiped, densely black strigose, each valve with an indistinct ridge along each suture and a prominent one 2 mm. from the ventral suture, 10–12 cm. long, 18 mm. broad, inner layer closely attached; seeds strongly compressed, gray marked with black, 10 mm. long, the linear hilum three-fourths as long.—Section *Eucanavalia*, near perhaps to *C. boliviana* (Piper). *Klug 4351*, Juanjuí, San Martín, determined by Standley as *C. eurycarpa* with query, could rather be this in flower; calyx scarcely 1 cm. long, glabrate except appressed strigillose toward tip, lower tooth almost minute; corolla white and violet, 2 cm. long, keel strongly falcate.

Junín: La Merced, low liana on river bank brush, *5551*, type.

Canavalia Piperi Killip & Macbr., spec. nov.

Affinis *C. maritimae;* caulibus foliolisque tenuioribus ubique adpresse strigillosis; foliolis late oblongo-ellipticis vel fere orbiculatis basi et apice rotundatis vel apice minute acutis vel apiculatis plerumque 7–8 cm. longis, 4–6 cm. latis; floribus ignotis; leguminibus circa 5 mm. longe stipitatis, 10 cm. longis, 2.5–3 cm. latis, alis satis prominentibus a carina circa 5 mm. longe distantibus; seminibus pallide bruneis, circa 2 cm. longis fere 1.5 cm. latis, hilo lineari 8–10 mm. longo.—Obviously an ally of *C. maritima* but with thin leaflets and much larger concolored seeds; Piper wrote on the type "nearest *C. arenicola* Piper (Mexican) but probably n. sp."

Cuzco: Santa Ana, *Cook & Gilbert 1604* (type, U. S. Nat. Herb.); *1586*. "Abella blanca," "huaco blanco."

27. DIOCLEA HBK.

Cratylia Mart. ex Benth. Ann. Naturh. Hofmus. Wien 2: 132. 1838. *Cleobulia* Mart. ex Benth. l.c. 131.

Reference: Benth. in Mart. Fl. Bras. 15, pt. 1: 160–167. 1859.

Lianas or shrubby with much elongate branches, the stipulate leaves pinnately 3-foliate, the leaflets stipellate. Flowers small to rather large, white, blue, pink or purple, fasciculate in long racemes, the fascicles on nodes or oblong bases. Bracts promptly caducous, the small but broad bractlets scarcely longer. Calyx campanulate or tubular, sometimes silky within, the 2 upper lobes connate in one entire or emarginate one, the lower often longer. Banner orbiculate, unappendaged. Alternate anthers sometimes reduced, sterile. Ovary stiped, many-ovuled, the glabrous, incurved style with capitate stigma. Pods oblong-suborbicular to linear, turgid or compressed, the sutures more or less, sometimes scarcely, margined or enlarged, thinly segmented within between the seeds, these with short or elongate and linear hilum.

Besides the work of Bentham I acknowledge my indebtedness to Ducke, Archiv. Jard. Bot. Rio Jan. 4: 93–98. 1925, who has supplied an excellent key to the species of Pará; these two treatments and that of Miss Amshoff, Fl. Sur. 2, pt. 2: 200–209. 1939, account for most of the species of South America with the exception of three Ecuadorian ones described by Diels in Bibl. Bot. 116: 1937. The character or characters relied upon to distinguish *Cratylia* and *Cleobulia* are also found in varying degree of development in *Dioclea* and therefore are not of taxonomic importance.

Anthers uniform, all fertile; stipules small, not prolonged below the point of insertion.

Leaflets usually silvery pubescent beneath; bractlets minute; flowers short or rather short; pod sutures little enlarged.

Flowers about 1 cm. long.....*D. Huberi.*

Flowers to 2 cm. long.....*D. argentea.*

Leaflets if more or less pubescent not appressed silvery beneath.

Flowers borne rather laxly, the wings not greatly reduced.

Calyx to about 1.5 cm. long; flowers short or somewhat longer than broad.

Bractlets minute, coriaceous.

Flowers about as broad as long; leaves glabrous.
D. macrocarpa.

Flowers larger, often longer than broad; leaves pubescent.

Calyx teeth long, acuminate.....*D. lasiophylla.*

Calyx teeth short, obtuse.....*D. dichrona.*

Bractlets thin, pale or pinkish, enclosing the buds.
D. virgata.

Calyx about 2 cm. long; bractlets conspicuous; flowers elongate.....*D. macracantha.*

Flowers in compact racemes, the wings scarcely obvious.
D. leiantha.

Anthers dissimilar, 5 fertile, the alternate 5 smaller, sterile; stipules sometimes large and prolonged; flowers short, the keel often incurved.

Leaves glabrous or sparsely and unevenly pubescent beneath, the trichomes mostly or all on the nerves.

Stipules small, not produced; inflorescence glabrate..*D. glabra.*

Stipules produced, sometimes caducous; inflorescence pubescent.
D. violacea.

Leaves shortly pilose both sides or evenly pubescent beneath.

Leaves glabrous or glabrate above unless on midnerve; branches appressed or shortly pubescent.

Leaves sparsely appressed hispidulous beneath..*D. ucayalina.*

Leaves densely sericeous pilose beneath.....*D. funalis.*

Leaves typically pilose above; branches more or less hirsute.
D. megacarpa.

Dioclea argentea Desv. Ann. Sci. Nat. sér. 1. 9: 420. 1826. *Cratylia argentea* (Desv.) Kuntze, Rev. Gen. 3, pt. 2: 58. 1898. *C. floribunda* Benth. Ann. Naturh. Hofmus. Wien 2: 132. 1838. *D. pauciflora* Rusby, Mem. Torrey Club 6: 25. 1896. *C. pauciflora* (Rusby) Harms, Repert. Sp. Nov. 19: 17. 1923. *C. nuda* Tul. Arch. Mus. Paris 4: 68. 1841. *C. floribunda* Benth. var. *nuda* (Tul.) Hassl. Ann. Cons. Jard. Bot. Genève 21: 219. 1919.

Leaflets broadly ovate, somewhat caudate acuminate, glabrous above, more or less silvery pubescent beneath or sometimes glabrous, commonly 1 dm. long, 6 cm. broad; racemes usually 2–3 dm. long, sometimes panicled; pedicels short, silky pubescent as the calyces, these 7–10 mm. long; banner nearly glabrous to densely appressed sericeous, to 2 cm. long. The glabrous form may be designated var. **nuda** (Tul.) Macbr., comb. nov. (*C. nuda* Tul. l.c.), which as to type has a densely silky banner; however, the degree of pubescence on banner is scarcely taxonomically significant so *C. pauciflora* may be included in the var. *nuda* as an extreme state with even the banner glabrate; this variation has been named *C. floribunda* var. *intermedia* Hassl. l.c. As Harms suggested it could be treated as another variant but it seems preferable to let variety *C. nuda* include it.

Apurímac: Río Piene, *Weberbauer 5630* (det. Harms as *C. pauciflora*).—Río Acre: *Ule 9457* (det. Harms as *C. floribunda*). Bolivia to Argentina and Brazil.

Dioclea dichrona Macbr., comb. nov. *Cratylia mollis* Mart. ex Benth. Ann. Naturhist. Hofmus. Wien 2: 132. 1838, not *D. mollis* (Jacq.) DC. *C. dichrona* Macbr. Field Mus. Bot. 8: 104. 1930.

Younger branches and petioles densely and softly puberulent; leaves long petioled, the broadly ovate or oval obtuse or obtusely pointed leaflets finely and sparsely pilose above, densely and softly subappressed villous beneath, usually 5–7 cm. broad, about 10 cm. long; calyces densely pubescent, the trichomes usually silky and closely appressed, the blunt lobes about half to nearly as long as the tube; banner more or less silky pilose without to glabrous, to 2 cm. long; pods about 1 dm. long, 1.5 cm. broad, softly pubescent.—Variable in size of flowers and length of calyx-lobes; there may be a varietal difference between the plant of Brazil and that of Peru, the latter having slender pedicels at least in fruit, shorter calyx lobes, the pubescence on the pods not so thick. F.M. Negs. 6303; 2400 (with an unpublished name after Mathews).

San Martín: Tarapoto, *Spruce 3927*. Chazuta, *Klug 4146*.—Junín: La Merced, *5270* (type, *C. dichrona*); *Killip & Smith 23563; 24053*. Along Río Perené, *Killip & Smith 25132*. Brazil.

Dioclea funalis Poepp. & Endl. Nov. Gen. & Sp. 3: 59. 1845.

Branchlets, peduncles and petioles densely pubescent with rusty firm trichomes, the branches glabrate; petioles 5–6 cm. long; leaflets oblong-elliptic, minutely and obliquely cordate at base, shortly and abruptly acuminate, chartaceous-coriaceous, densely silky appressed pilose beneath, soon glabrous above except along the nerves, about 8 cm. long, 5 cm. broad, or larger; racemes several dm. long, densely hirsutulous-pilose, floriferous to below the middle; bractlets suborbicular, scarcely 2 mm. long; calyces 15 mm. long, appressed silky pilose; flowers about 2 cm. long, purple, the white keel curved; alternate stamens sterile; pods to 2 dm. long, oblong, densely tomentose.—Seeds unknown; description as to flowers after *Stork & Horton 9592*. F.M. Neg. 32008.

Huánuco: Cuchero and Pampayacu, *Poeppig 1452*, type. In red clay, 1,300 meters, Puente Durand, Río Chinchao, *Stork & Horton 9592* (distr. as *D. lasiocarpa*).

Dioclea glabra Benth. Ann. Naturh. Hofmus. Wien 2: 133. 1838; 164.

Glabrous or essentially, except for a minute pubescence on the calyx and, in the case of the Peruvian specimens, a sparse and deciduous pilosity on the leaf-nerves beneath; stipules small, caducous, not produced at base; petioles usually about 10 cm. long; leaflets broadly oval, abruptly and shortly acuminate, 6–9 cm. broad, 8–16 cm. long; nodes of the flowers shortly stiped, produced to below the middle of the long but robust peduncle; pedicels 2–4 mm. long; bractlets minute, caducous; calyx-tube 8 mm. long, the broadly ovate divisions 4–5 mm. long, the narrower lower one 6 mm. long; banner complicate and provided with inflexed auricles, finally curved-reflexed, about 12 mm. long; keel obtuse, beaked; ovary densely villous, 2–3-ovuled, the style glabrous; pods 8–16 cm. long, 3–4.5 cm. broad, glabrous; seeds 2–3, oval, with short, oblong hilum.—*D. bicolor* Benth. l.c., 165, is apparently scarcely separable except that the leaflets beneath and pods are more or less pubescent, the latter 10–20 cm. long, 3–6 cm. broad. Flowers blue or lilac in the Schunke specimens, white or rose-violet, fide Ducke. F.M. Neg. 32009.

Loreto: Mouth of Santiago, *Tessmann 4540* (det. Harms). Mishuyacu, *Klug 236; 1024* (det. Killip). Río Mazán, *Schunke 352* (det. Standl.); *62* (distr. as *D. bicolor*). Brazil and Guiana.

Dioclea Huberi Ducke, Archiv. Jard. Bot. Rio Jan. 3: 172. 1922.

Glabrate or inconspicuously puberulent except the ample leaflets beneath, these silvery with a close appressed pilosity, oval, broadly rounded at base, shortly caudate-acuminate, commonly 9 cm. wide, 13–16 cm. long; nodes of the flower clusters shortly peduncled; pedicels 2–3 mm. long; bractlets broadly ovate, about 2 mm. long, moderately persisting; banner more than 1.5 cm. broad; anthers all fertile; ovary long-pilose with 5 ovules; mature pod subligneous, glabrate, sutures little enlarged, linear-oblong, 15–20 cm. long, about 5 cm. broad, elastically dehiscing, the seeds often 4, oval, about one-fourth encircled by the pale hilum.—Probably a species of *Cratylia* if that group is recognized. Illustrated, Ducke, Archiv. Jard. Bot. Rio Jan. 4: *pl. 7*. F.M. Negs. 18396; 28071.

Loreto: Río Mazán, *Schunke 138* (det. Standl.). Mishuyacu, *Klug 644* (det. Killip). Brazil.

Dioclea lasiophylla Mart. ex Benth. Ann. Naturh. Hofmus. Wien 2: 134. 1838; 166.

Densely to moderately velvety tomentose-pilose nearly throughout including the pods, or the calyces merely closely appressed strigillose as the leaves above in age; stipules minute, caducous; petioles 2.5–5 cm. long; leaflets rounded at both ends, commonly 6–8 cm. long, 3.5–4.5 cm. broad; peduncles greatly elongating, the flower-bearing nodes sessile; pedicels 4–6 mm. long; bractlets 2–3 mm. long, ovate; calyx-tube 6 mm. long or longer, the upper lobes as long, the lower longer; flowers violet-purple, about 2.5 cm. long, the banner ovate, emarginate; keel erostrate, subequaling the oblong wings; pods about 7 cm. long, 1 cm. broad.—F.M. Neg. 6310.

Peru (possibly). Bolivia; Brazil.

Dioclea leiantha (Mart.) Macbr., comb. nov. *Cleobulia leiantha* Mart. ex Benth. Fl. Bras. 15, pt. 1: 168. 1859.

Densely rusty tomentose nearly throughout except the tubular-campanulate, colored calyx, this glabrous or glabrate without, finely sericeous within; larger leaflets 10 cm. long or longer, 7 cm. broad, rounded at base and apex or acutish, more or less rugose-veined; banner about 14 mm. long, orbicular, slightly spreading; pods 7.5

cm. long, 2 cm. broad, appressed rusty pubescent, the reniform seeds with semi-encircled linear hilum.—There are two other allied species: *C. multiflora* Mart., similar, but the calyx rusty villous, and *C. diocleoides* Benth., the racemes lax, the banner strongly reflexed. The genus *Cleobulia*, as remarked by Bentham and Hooker, was altogether artificial.

Río Acre (fide Ducke). Brazil.

Dioclea macracantha Huber, Bol. Mus. Goeldi 5: 408. 1908.

Similar to *D. virgata* but the leaflets minutely pubescent or glabrate, broadly ovate, 7–8 cm. long, 4–5 cm. broad; calyx-tube about 15 mm. long, subequaled by the upper and lower narrow lobes; banner to 4.5 cm. long, the keel with a few teeth on the upper margin; pods 10–14 cm. long, about 2 cm. broad.—*D. fimbriata* Huber, l.c. 409, is similar but the leaflets are velvety pilose both sides, the keel of the even larger flowers deeply fimbriate. F.M. Neg. 2408.

Peru (probably). Amazonian Brazil.

Dioclea macrocarpa Huber, Bol. Mus. Goeldi 5: 410. 1908.

Glabrous, except sometimes the sparsely puberulent younger branchlets and the young, rusty hispidulous pods; stipules minute, ovate; petioles to 15 cm. long; leaflets ovate-elliptic or slightly obovate, broadly rounded at base, abruptly and shortly acuminate, finally subcoriaceous, 10–16 cm. long, 6–9 cm. broad; peduncles glabrescent, the flower-bearing nodes often on peduncles 5–8 mm. long; pedicels to 5 mm. long, the minute caducous bractlets only 1.5 mm. long; calyx campanulate, a little puberulent, the tube 8 mm. long, the curved lower tooth as long; banner orbicular, clawed, the inflexed auricles finally reflexed; keel obtusely rostrate; stamens all fertile; ovary 5-ovulate; pods oblong, obliquely and transversely rugose, 18–30 cm. long, 5–6 cm. broad, the orbiculate black seeds with short elliptic hilum.—Illustrated, Ducke, Archiv. Jard. Bot. Rio Jan. 4: *pl. 6*. F.M. Neg. 28072.

Loreto: Iquitos (fide Ducke). Amazonian Brazil to the Guianas.

Dioclea megacarpa Rolfe, Kew Bull. 139. 1901. *D. densiflora* Huber, Bol. Mus. Goeldi 5: 406. 1908, fide Amshoff.

Rather loosely villous hirsutulous especially the stems, long petioles, leaves beneath and peduncles; stipules large, prolonged

beyond the insertion and more or less persisting; leaflets broadly elliptic, rounded at base, abruptly and very shortly acuminate, 10–17 cm. long, 8–13 cm. broad, less densely pilose above than below; peduncles densely flowered, the nodes sessile; bracts linear-lanceolate, spreading or recurved, membranous, pilose, to 15 mm. long, the subrotund bractlets 2–3 mm. long; flower-buds incurved, the velvety calyx about 15 mm. long, the upper lobes broad, shortly 2-toothed, gibbous at base, nearly equaled by the 2 lateral, ovate, subacute teeth, the lowest tooth narrow and longer; banner 18–25 mm. long, 25 mm. broad, violet with yellow center; keel incurved; 5 anthers reduced, sterile; pods 14–18 cm. long, 4–6 cm. broad, the upper suture straight, rusty pubescent even in age; seeds 3 or 4, lustrous, about 3 cm. broad, encircled two-thirds by the hilum.—Fide Amshoff, Med. Bot. Mus. Rijks Herb. Utrecht 52: 67. 1939, distinct from *D. reflexa* Hook, which, however, is perhaps a variety of *D. funalis;* the former as to type has lanceolate, more rigid, reflexed, appressed pubescent bracts, the flower-buds straight or nearly so, both sutures of the glabrate (mature) pod curved; *D. funalis* is imperfectly known, and the following collection with red-violet flowers should perhaps be referred to it, but as to pubescence it most resembles *D. megacarpa. D. comosa* (Meyer) Kuntze may be, fide Amshoff, *D. reflexa* and is earlier (1818).

San Martín: Near Moyobamba, 1,200 meters, *Klug 3435.* Colombia to Paraguay and Brazil; Trinidad; Tobago.

Dioclea ucayalina Harms, Notizbl. Bot. Gart. Berlin 9: 262. 1925.

Stems, petioles and peduncles shortly and moderately to sparsely appressed villous-strigillose; stipules apparently caducous; leaflets ovate-elliptic, rounded at base, subabruptly and shortly acuminate, glabrous above except on the midnerve or lateral nerves, shortly and rather sparsely subappressed hispidulous beneath, especially on the prominent reticulate veins, usually 8–10 cm. long, about half as broad, or larger; peduncles elongate, the flower-bearing nodes typically subsessile, the lower apparently sometimes pedicellate; bracts linear-lanceolate, 2–2.5 mm. long, soon deciduous; pedicels 4–7 mm. long; bractlets broader than long, nearly 3 mm. long; calyx to 17 mm. long, the lowest tooth 8–10 mm. long, slightly shorter than the tube; flowers glabrous, the suborbicular banner shortly clawed, inflexed auriculate; keel shortly beaked, curved, 2.5 cm. long; ovary densely hirsute-villous.—Differs according to

the author from *D. densiflora* Huber, i.e. *D. megacarpa*, in the small bracts and shorter pubescence and from *D. malacocarpa* Ducke (Archiv. Jard. Bot. Rio Jan. 3: 170. 1922) in the sessile flower nodes and the more pubescent leaves; the following Mexia specimens should perhaps be referred to the Ducke species because the nodes are pedicelled but they are scattered and remote; in *D. malacocarpa* the nodes are approximate; certainly the species seem to be very closely related, the fruit of *D. ucayalina*, however, being unknown. The pod of *D. malacocarpa* is subcylindrical, 10–15 cm. long, 4–4.5 cm. wide, 3.5–4 cm. thick, dense rusty hirsute with 2–5 opaque seeds half encircled by the hilum. F.M. Neg. 2411.

Loreto: Yarina Cocha, flood-free wood, banner pale lilac, medially yellowish spotted, *Tessmann 3464*, type. Río Paranapura, flowers lilac, violet and yellow, *Klug 3935* (det. Standl., *D. lasiocarpa*). Above Pongo de Manseriche, Río Santiago, flowers pinkish-lilac, *Mexia 6326*(?).

Dioclea violacea Mart. ex Benth. Ann. Naturh. Hofmus. Wien 2: 132. 1838; 162.

Branches and petioles somewhat fulvous pilose or becoming glabrate; stipules semi-sagittate, the lanceolate lobes 6–8 mm. long; leaflets ovate, laxly pilose beneath especially on the nerves, mostly 10 cm. long or longer, about 7 cm. broad, rounded or subcordate at base, minutely acuminate; peduncles elongate; bracts linear, 8–12 mm. long, caducous; pedicels 2–4 mm. long; bractlets small, orbiculate, deciduous; calyx tomentulose, the tube 8 mm. long, the teeth all shorter, the upper one rounded; banner about 1.5 cm. long, a third broader, the wings nearly 2 cm. long, the shorter keel subrostrate; pods glabrate at maturity, 1 dm. long or somewhat longer, 4–6 cm. broad, 1.5–2 cm. thick, the nearly straight upper suture strongly dilated, the lower scarcely at all and curved; seeds 2–4, half encircled by the linear hilum.

Loreto: Mishuyacu, *Klug 696*. Brazil to the Guianas.

Dioclea virgata (Rich.) Amsh. Med. Bot. Rijks Herb. Utrecht 52: 69. 1939. *Dolichos virgatus* Rich. Act. Soc. Hist. Nat. Paris 1: 111. 1792. *Dioclea lasiocarpa* Mart. ex Benth. Ann. Naturh. Hofmus. Wien 2: 133. 1838; 166.

Minutely strigillose nearly throughout or the leaves more or less finely pilose beneath and well marked by the papery pinkish or pale more or less prominent deciduous bractlets, 5–10 mm. long;

flower-bearing nodes subsessile or the lower pedicellate, borne rather remotely; pedicels pubescent, slender, about as long as the suboval bractlets; calyx glabrous or nearly, the tube to 1 cm. long; flowers lilac, the banner 2–2.5 cm. long; anthers all fertile; ovary villous, usually 10-ovulate, the pod unless at maturity rusty bristly, 7–12 cm. long, 2 cm. wide, the upper suture enlarged; seeds oblong, half encircled by the linear hilum.—Woytkowski noted the flowers pale violet purple with fine streaks of dark purple, white toward the base, slightly fragrant. Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 44*.

Huánuco: Monzón, *Weberbauer 3616* (det. Harms). Shapajilla, 630 meters, *Woytkowski 37* (det. Standl., *D. funalis*).—Junín: Puerto Yessup, *Killip & Smith 26312*. Puerto Bermúdez, *Killip & Smith 26409*.—Loreto: Pucalpa, middle Ucayali, *Tessmann 3104* (det. Harms). Soledad, *Tessmann 5178* (det. Harms). Lower Río Nanay, *Williams 319; 640*. Yurimaguas, *Killip & Smith 27945*. Mishuyacu, *Killip & Smith 29895; Klug 1211; 1459*. Florida, *Klug 2052*. Balsapuerto, *Klug 3030*. Iquitos, *Killip & Smith 27335* (glabrate). Brazil to Colombia and the Guianas.

28. CYMBOSEMA Benth.

Similar to *Dioclea* but the upper calyx-tooth bidentate, the banner oblong ovate, the stamens connate except the vexillar, and the pods broadly oblong, only three times longer than broad.

Cymbosema roseum Benth. in Hook. Journ. Bot. 2: 61. 1840. *Dioclea purpurea* Poepp. & Endl. Nov. Gen. & Sp. 3: 59. 1845.

High climbing, the semiherbaceous stems above as well as the long petioles and peduncles minutely appressed strigillose; leaflets oblong-elliptic, 7–13 cm. long, 3.5–7 cm. broad, membranous, finely reticulate-veined, slightly strigose above, rather to densely hirtellous beneath; peduncles floriferous only above the middle, the sessile nodes 2–3-flowered; flowers 3 cm. long or longer, deep rose or purple; calyx about 10 mm. long, somewhat gibbous at base, sparsely and minutely strigillose, the lanceolate acute teeth shorter than the tube, the uppermost minutely 2-toothed; ovary densely silky pilose; pods sessile, about 5 cm. long, 2 cm. broad, glabrate at maturity with 3–6 lustrous seeds semi-encircled by the linear hilum.—Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 42*.

Loreto: Rancho Indiana near Iquitos, *Mexia 6419* (det. Standl., *D. lasiocarpa*). Río Mazán, *José Schunke 34* (det. Killip). Río Nanay, *Williams 530*. British Guiana to Paraguay.

29. GALACTIA P. Br.

Suffrutescent or herbaceous, often twining plants with pinnately 3-foliolate leaves, the leaflets (rarely 1–7) stipellate. Stipules small or deciduous. Flowers geminate or fasciculate in axillary racemes (rarely pseudo-fasciculate), the bracts often setaceous, the bractlets minute. Calyx lobes subulate, 4. Keel of the small or sometimes showy corolla erostrate. Stamens 10, the vexillar free; anthers uniform. Style slender, glabrous. Pods sessile, narrow, pubescent, straight or incurved, compressed, slightly septate between the 5–12 seeds.—Genus in need of revision.

Flowers fascicled axillary, the racemes greatly reduced. . *G. shumbae.*

Flowers evidently racemose.

Flowers 1 cm. long or shorter.

Leaflets obtuse or acute, variable but not ovate-acuminate.

Leaflets suborbicular, 3 cm. wide or wider; calyx spreading villous (Peruvian var.) . . . . . *G. Jussiaeana.*

Leaflets oblong or ovate elliptic; calyx appressed pubescent. *G. striata.*

Leaflets ovate-acuminate . . . . . *G. Killipiana.*

Flowers 11–16 mm. long.

Pedicels partly fasciculate, 1–3 mm. long; flowers 11–13 mm. long . . . . . *G. Augusti.*

Pedicels geminate, 4–5 mm. long; flowers about 15 mm. long. *G. Cesari.*

Galactia Augusti Harms, Repert. Sp. Nov. 19: 16. 1924.

Slender-stemmed vine, appressed pilose throughout except the glabrate calyx, the trichomes fine, not dense enough to conceal the surface; petioles 1–3 cm. long; leaflets 3, elliptic or slightly obovate, rounded at each end but mucronate apically, mostly 2–4 cm. long, 1–2 cm. broad; racemes usually somewhat longer than the leaves, 2–7 cm. long, the flowers, at least the upper, fasciculate on pedicels only 1–2 (3) mm. long; bractlets broadly lanceolate, acute, 2–2.5 mm. long; calyx 7–8 mm. long, the lanceolate acute lower teeth to 4.5 mm. long, the lateral shorter; corolla glabrous, purple, to 13 mm. long.—F.M. Neg. 2386.

Huancavelica: Below Colcabamba, Valley of the Río Mantaro, 2,000 meters, *August Weberbauer 6459*, type.

Galactia Cesari Macbr., spec. nov.

Herba prostrata vel volubilis; caulibus ut videtur inferne plus minusve lignescentibus, superne adpresse piloso-strigillosis; petiolis 1–2 cm. longis; foliolis ovali-ellipticis vel subrotundatis, membranaceis, sparse adpresse pilosis praecipue subtus, plerumque 8–10 mm. latis, 10–14 mm. longis; racemis 4–8 cm. longis; pedicellis geminatis 5–7 mm. longis; calyce mediocriter adpresse piloso 9.5 mm. longo, dente infimo fere 5 mm. longo; floribus glabris 16–18 mm. longis, vexillo obovato 9 mm. lato; ovario dense adpresseque piloso.—This plant was distributed as *G. Augusti* to which indeed it seems to be more closely allied than to any other species, but is distinct in its smaller leaves and larger flowers borne only in pairs. A further species that may be related, known to me only from the meager description (and one leaflet) is *G. montana* Britton, Bull. Torrey Club 16: 324. 1889, of Bolivia, described as having oblong leaflets, softly pubescent branchlets, racemes shorter than the leaves. According to the collectors an attractive little prostrate vine, the banner and wings rose or dark rose, the keel paler. The choice of name is with my friend's permission and commemorates his sojourn at Field Museum in 1941.

Cuzco: In rocks, Hacienda Paucartica, 3,100 meters, *Cesar Vargas 161*, type.—Apurímac: Clambering over rocks, Pachachaca Valley, 2,100 meters, *Stork, Horton & Vargas 10566*. "Trebol sylvestre."

Galactia Jussiaeana Kunth, Mim. 196. *pl. 55*. 1824.

Suffruticose, twining, more or less pilose or villous especially the upper stems and racemes or apparently typically erect and white silky tomentose nearly throughout; leaflets elliptic to suborbicular or typically oblongish; flowers few, clustered or in short racemes, only tardily remote; banner reflexed, spreading, about 1 cm. long; calyx 6–8 mm. long, the teeth at least twice as long as tube; pods 5–6 cm. long, 5–7 mm. broad, tomentose or short-villous.—Highly variable species as to habit, pubescence and shape of leaves or not understood and several included as interpreted here. The var. *volubilis* Benth. in Mart. Fl. Bras. 15, pt. 1: 143. 1859, resembles the Peruvian plant in habit, but at least as to type is softly white pubescent; to it, however, have been referred collections from the Galapagos Islands which are green, lightly more or less appressed pilose except for the slender stems and calyces, these with more spreading trichomes. These specimens differ from *G. Jussiaeana*

further, at least from the typical form, in their suborbicular leaflets, in this character suggesting *G. obovata* Malme, Arkiv. Bot. 23A, no. 13: 88. 1931, commonly erect, and *G. remansoana* Harms, Bot. Jahrb. 42: 216. 1908, but the leaves in this are only half as large, thick, reticulate and with spreading pubescence. In view of these differences it seems desirable to define the Peruvian plant at least varietally and it may become *G. Jussiaeana* var. **peruviana** Macbr., var. nov., suffruticosa, volubilis; foliis late obovatis vel suborbiculatis plerumque 3 (5) cm. latis, 4 (5) cm. longis, leviter et appresse pilosis imprimis subtus; bracteis calycibusque dense et molliter villosis.

Tumbez: In deciduous bushwood, Ricaplaya, 150 meters, *Weberbauer 7733* (type, var. *peruviana*).—Piura: Talara, *Haught 85*. —Ancash: Huailas to Mato, (*Raimondi*). West Indies, tropical South America and Central America.

Galactia Killipiana Macbr., spec. nov.

Herba volubilis; caulibus petiolis pedunculisque sparse strigillosis demum glabris; petiolis 3 cm. longis; foliolis late ovato-lanceolatis, gradatim acuminatis, basi marginulatis vel rotundatis membranaceis utrinque tenuiter reticulatis, supra glabris, subtus pallidioribus et minute adpresseque strigillosis, subaequalibus, terminalibus 6–8 cm. longis, 3–4 cm. latis; pedunculis circa 8 cm. longis, racemis 10–15 cm. longis; pedicellis plerumque 2–3, vix 2 mm. longis; bracteis lanceolatis circa 1.5 mm. longis, bracteolis minutis; calycis leviter adpresse strigillosis circa 6 mm. longis laciniis tubo longioribus anguste lanceolatis, acutissimis; floribus 10 mm. longis, vexillum circa 5 mm. latum; leguminibus (valde immaturis) adpresse pubescentibus 5 cm. longis, 7 mm. latis.—Nearest apparently Colombian species (undescribed) and not to be included in *G. striata* (Jacq.) Urb. or *G. tenuiflora* (Klein) Wright & Arn. however these may be interpreted.

Junín: La Merced, wooded valley, *Killip & Smith 30675* (type, U. S. Nat. Mus.).

Galactia shumbae Harms, Repert. Sp. Nov. 19: 16. 1924.

Depressed shrub, the branches prostrate or ascending, the younger as the leaves beneath and petioles more or less hirsute-villous; petioles 1–2 cm. long; leaflets 3, broadly obovate or subrotund, sometimes retuse, strongly reticulate, especially beneath in age, mostly about 1.5 cm. broad and long; peduncles 1–1.5 cm. long, seemingly 1-flowered, the flowers thus appearing fascicled in the axils; calyx lightly hirsutulous, 7–8 mm. long, the lanceolate teeth acute; flowers purple, glabrous, scarcely 10 mm. long.—F.M. Neg. 2395.

Cajamarca: In rainy-green shrubs between Valley of the Shumba and Jaén, *Weberbauer 6180*, type.

Galactia striata (Jacq.) Urb. Symb. Ant. 2: 320. 1900. *Glycine striata* Jacq. Hort. Vindob. 1: 32. *pl. 76*. 1770. *G. tenuiflora* (Klein) Wight & Arn. Prodr. Fl. Ind. Or. 1: 206. 1834(?).

Perennial vine, the long more or less densely pubescent stems becoming glabrous and woody below; leaflets 3, typically ovate-elliptic, subequally narrowed at both ends, rounded or very obtuse, minutely mucronate, usually 3–4 cm. long and about half as broad, sometimes smaller or somewhat larger, membranous, more or less appressed pilose above or especially beneath; racemes often elongating and thus many-flowered, the pedicels 2–2.5 mm. long; calyces appressed pubescent, 7 mm. long, the lanceolate teeth twice as long as the tube; banner 8–9 mm. long; pods straight or slightly incurved, 4–7 cm. long, 6–9 mm. broad, more or less densely pubescent.—According to Urban, whose interpretation of this variable vine is followed, *G. tenuiflora* has calyx 4 mm. long, corolla 8 mm. long, pods only about 4 cm. long, arcuate-incurved; but it seems probable that there is one variable species concerned. The Willd. Herb. specimen of Klein's species is represented in Field Museum by F.M. Neg. 2397. The following specimens exhibit great variation in leaves from rotund to oblong-elliptic and as they are only in fruit may not all belong here.

Cajamarca: Cayacati, (*Raimondi*).—Junín: Vine in sandy valley floor, La Merced, *5471*.—Huánuco: Trail on stony slope, Mito, *3262*. Prostrate on sparsely shrubby slope, Yanano, *3790*. Cuzco(?): *Vargas 1720* (fide Schubert). Widely distributed.

30. COLLAEA DC.

Like *Galactia* but at least characteristically shrubs with showy flowers, the petals broad, the vexillar stamen connate medially.—Genus retained here for convenience, as the one representative in Peru is a prominent part of the Andean flora at middle elevations and because of its habit seems entirely aberrant among the twining species of *Galactia*. That genus, however, except as here in floristic work should be drawn to include it as suggested by Bentham and followed by Britton.

Collaea speciosa DC. Mem. Leg. 6: 245. *pl. 40*. 1825. *Galactia speciosa* (DC.) Britton, Bull. Torrey Club 16: 262. 1889.

Shrub 1–3 meters high, with oblong-elliptic or oblong-lanceolate leaflets and short racemes of showy usually rose-red flowers; branchlets virgate, densely appressed silky pilose as also the peduncles, pedicels and calyces; leaflets ordinarily 5–7 cm. long, 1–2 cm. broad, acute at both ends, pale green and glabrous above, densely tomentulose beneath, the midnerve and veins hirsute-pilose; racemes shorter than the leaves, the pedicels about 1.5 cm. long; calyx to 2 cm. long, the tube equaled by the longest lanceolate acute tooth, the other teeth broader, shorter; corolla to 3 cm. long, the banner lightly pilose without; pods densely reddish-brown tomentose, 7 cm. long, 14 mm. broad.—The shrub is ordinarily open in growth with remote, virgate branches, the pubescence especially on the calyces reddish-brown; according to Stork & Horton the wood is hard. Woytkowski has observed that the flower-buds are dark red, the opening flower "takes a deeper hue until it reaches a deep violet-purple color" or bluish (Stork & Horton). The type was sent to DeCandolle from Madrid by Lagasca, probably part of a collection by Ruiz & Pavón from Huassahuassi. Common in central and southern Peru in open shrub-lands and on canyon sides.

Huánuco: Near Huánuco, *Woytkowski*. Carpish, open spaces, 2,800 meters, *Stork & Horton 9906*. Mito, canyon sides, *1369*. Pampayacu, *Kanehira 245*. Near Panao, *2221*.—Junín: Near Huacapistana, *Killip & Smith 24118; 24478;* (Weberbauer, 248). Hacienda Cabello above Huertas, canyon slope, *1333*.—Huancavelica: Near Salcabamba, 3,300 meters, *Stork & Horton 10302*.—Cuzco: Machu-picchu, 2,200 meters, *Stork, Horton & Vargas 10509; Vargas 803; Herrera 3225; Soukup 129*. Cerro de Cusilluyoc, 2,500 meters, *Pennell 13999*. Near Acharini, *Vargas 11127*.—Puno: Rocky slopes of Limbane as far as Agualani, 2,500 to 3,400 meters, *Vargas 9640; 1315;* (Weberbauer, 237). "Chchogara," "chuchullagoi," "micullu," "huayana-picchu" (Herrera).

31. CALOPOGONIUM Desv.

Reference: *Stenolobium* Benth. in Mart. Fl. Bras. 15, pt. 1: 138–141. 1859.

Rather coarse, more or less lignescent and pubescent vines with pinnately 3-foliate leaves and small flowers borne in fascicles at thickened points on elongating axillary racemes. Calyx campanulate or tubular, the upper teeth distinct, connate or bidentate. Vexillar stamen free.—Otherwise similar to *Galactia*.

Calopogonium coeruleum (Benth.) Sauv. Ann. Acad. Havana 5: 337. 1869. *Stenolobium coeruleum* Benth. Ann. Naturh. Hofmus. Wien 2: 125. 1838; 139.

Densely to lightly pubescent, the trichomes especially on the leaves beneath usually closely appressed; leaflets irregularly rhomboid-ovate, oblong or acutish, 4–12 cm. long, 2–7 cm. broad; racemes finally 2–3 dm. long, the flowers several–6 at each node, shortly pedicelled; bracts and bractlets 4 mm. long; calyx 4 mm. long, the narrow teeth shorter or nearly as long as the tube; corolla violet, 7 mm. long (10); pods about 4–6 cm. long, 6–8 mm. broad.—*C. mucunoides* Desv. (*Stenolobium brachycarpum* Benth., 140) is similar, but the calyx attains 6 mm. and the teeth are subulate, the 3 lower much longer than the tube; *C. velutinum* (Benth.) Amsh. (*Stenolobium velutinum* Benth., 139) has a tubular calyx 8 mm. long, the lanceolate teeth shorter than the tube.—*C. coeruleum* as interpreted varies here (determinations by Standley except as noted) in density of pubescence, the leaves beneath permanently softly villous or glabrescent, the latter apparently var. *glabrescens* (Benth.) Malme, Arkiv. Bot. 23A, no. 13: 87. 1931.

San Martín: Near Moyobamba, 1,100 meters, *Klug 3334*. Juanjuí, 500 meters, *Klug 4338*.—Loreto: Pumayacu, *Klug 3184*.—Puno: Chunchosmayo, Prov. Sandía, *Weberbauer 1179* (det. Berlin, *C. velutinum* var.).—Río Acre: *Ule 9462* (det. Harms). Tropical South America to Central America and the West Indies.

32. RHYNCHOSIA Lour.

Herbs, more or less suffrutescent, the Peruvian twining. Leaves pinnately or subdigitately 3-foliolate, the leaflets at least beneath with resinous glands. Stipules ovate or lanceolate. Flowers yellow in axillary usually geminate racemes, the bracts caducous. Calyx with 4 or 5 teeth, the 2 upper more or less united. Banner biorbiculate; keel broader than the wings, incurved, obtuse. Stamens diadelphous, the vexillar free, the anthers uniform. Ovary subsessile, 2-ovuled, the style filiform, glabrous. Pod compressed, narrow to broadly oblong, usually with 2 seeds, dehiscent.

Pods clearly constricted between the seeds; leaflets often 5 cm. wide or wider..... *R. pyramidalis.*

Pods not or obscurely constricted.

Flowers 10–12 mm. long; calyces and pods glandular. *R. mantaroensis.*

Flowers 4–6 mm. long; calyces and pods obscurely if at all glandular.

Pods puberulent, the ovary densely ashy pilose; leaflets often 2 cm. wide or smaller..... *R. minima.*

Pods somewhat setose, the ovary densely yellow-hispid; leaflets often 3 cm. wide or wider..... *R. apoloensis.*

Rhynchosia apoloensis (Rusby) Macbr. Field Mus. Bot. 4: 91. 1925. *Dolicholus apoloensis* Rusby, Bull. N. Y. Bot. Gard. 6: 515. 1910.

Shortly hispidulous or pilose throughout or the broadly rhomboid leaflets and upper stems glabrate; petioles 1.5–4 cm. long; mature leaflets usually about 4 cm. broad, 5 cm. long, acuminate; racemes to 1 dm. long, rather laxly many-flowered, the flowers 6–7 mm. long on pedicels 1.5–2 mm. long; calyx lobes lance-subulate, unequal, punctate glandular but scarcely viscid; ovary densely hispid, the pods sparsely so, 1.5 cm. long, half as broad.—The Williams collections except *6747*, det. Standl., were distributed as *R. minima.* Cf. *R. melanosticta* Griseb. typically of southern South America.

Junín: In hedge rows on sandy flat, La Merced, *5304; Killip & Smith 23420.*—San Martín: Tarapoto, *Williams 5444; 5507; 5580; 6598; 6747* (*Ule*, det. Harms). Juanjuí, *Klug 4201; 4371.* Venezuela; Bolivia.

Rhynchosia mantaroensis Macbr. Field Mus. Bot. 8: 105. 1930.

Suffruticose at base, the branches, petioles and peduncles softly and shortly reddish pubescent, finally glabrate; petioles about 2 cm. long; leaflets rhombic-deltoid, subequal, usually 3 cm. long, 2 cm. broad, sometimes small, scarcely acute, the younger softly pilose above, beneath especially on the veins reddish pilose and prominently reticulate; racemes viscidly hispidulous-pilose, laxly about 10-flowered, 6–8 cm. long; pedicels 2–3 mm. long, the bracts about twice as long; calyx-teeth scarcely equaling the tube; banner glabrous except toward the tip, lightly pilose and black punctate; pod oblong, 2 cm. long, about half as broad, viscid pilose.—Nearly *R. melanosticta* Griseb. and *R. reticulata* (Sw.) DC., species of southern South America or the West Indies, but differ in the glandular pubescence.

Huancavelica: Rainy-green shrubwood, 2,800 meters, *Weberbauer 7606*, type; *Killip & Smith 23344.*—Apurímac: Near Trancapata,

among shrubs, 2,900 meters, *Vargas 9623*. Pincos, *Stork & Horton 10669*.—Cuzco: Mayhua, *Vargas 877*.

Rhynchosia minima (L.) DC. Prodr. 2: 385. 1825. *Dolichos minimus* L. Sp. Pl. 726. 1753.

More or less puberulent especially on the slender stems, petioles, peduncles and on leaves beneath; racemes remotely, usually very remotely, flowered, the yellowish tinged with purple or red flowers 4–5 (6) mm. long; ovary densely ashy-pilose, the oblong pod merely puberulent, 1.5 cm. long, 5 mm. broad, with ellipsoid black seeds somewhat emarginate on one side.—The pods are narrow toward the base. Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 54*.

Lima: Trailing in banana grove, *544*.—Junín: On low shrubs in sand of stream bed, La Merced, *Killip & Smith 24050*.—Libertad: Pacasmayo, (*Raimondi*). Widely distributed in warm areas.

Rhynchosia pyramidalis (Lam.) Urb. Repert. Sp. Nov. 15: 318. 1918. *Dolichos pyramidalis* Lam. Encycl. 2: 296. 1786. *R. phaseoloides* (Sw.) DC. Prodr. 2: 385. 1825. *Glycine phaseoloides* Sw. Prodr. 2: 105. 1788.

Vigorous liana, at once recognizable in fruit by the black and scarlet seeds that are visible in the mature pods dehiscent along one suture; lower stems flattened and sometimes a cm. broad or larger; upper branches as the petioles and leaves beneath rather softly short pilose; rhomboid leaflets often 5–10 cm. broad, acuminate; flowers 8–10 mm. long, numerous, the racemes to 3 dm. long; pods puberulent, 2–2.5 cm. long or when rarely 1-seeded shorter, the black seeds scarlet about the hilum, variable in the extent of the red coloring.—Illustrated, Mart. Fl. Bras. 15, pt. 1. *pl. 54*.

Junín: Along Río Perené, *Killip & Smith 25201*. La Merced, *5805*. Tropical America. "Mulungú."

33. CAJANUS DC.

Bushy erect herb, the virgate upper stems densely leafy with pinnately 3-foliate leaves, the leaflets glandular-dotted beneath. Flowers in axillary racemes, solitary or panicled. Bracts deciduous, bractlets wanting. Calyx campanulate, 4-toothed, the upper tooth bifid. Banner clawed, calloused and auricled basally, the oblique keel incurved. Vexillar stamen free. Anthers uniform. Style dilated and glabrous above the middle, the stigma oblique. Pods compressed, the seeds separated, orbiculate.

Cajanus bicolor DC. Cat. Hort. Monsp. 85. 1813; Prodr. 2: 406. 1825. *C. indicus* Spreng. Syst. 3: 248. 1826. *Cytisus Cajan* L. Sp. Pl. 739. 1753. *C. Cajan* (L.) Millspaugh, Field Mus. Bot. 2: 53. 1900.

A shrub 1 to several meters high, the narrowly elliptic-lanceolate acute leaflets 4–9 cm. long, minutely but densely puberulent both sides, more or less cinereously beneath; flowers yellow streaked with red, nearly 2 cm. long; calyces about 1 cm. long, shortly rusty-villous as the pods, these 5–8 cm. long, the 5 (usually) seeds sometimes marked with purple.—The Millspaugh name is to all intent a repetition of the generic name. Cultivated for the delicious green beans.

Huánuco: In fence row, *2055*.—San Martín: Tarapoto, field, *Williams 6694; 7306*(?).—Loreto: Iquitos, clearing, *Killip & Smith 27151; Klug 171; Mexia 6505*. Yurimaguas, *Williams 4295; 4339*. Río Nanay, *Williams 1284*. Tropical and subtropical regions. "Frijoles de monte," "puspo-poroto."

34. ERIOSEMA DC.

Similar to *Rhynchosia* except that the petiole and rachis are very short and, especially, the seeds are affixed at one end to a linear hilum.

Eriosema rufum (HBK.) G. Don, Gen. Syst. 2: 347. 1832. *Glycine rufa* HBK. Nov. Gen. & Sp. 6: 423. *pl. 574*. 1824.

Densely reddish-brown villous throughout, the woody stem erect, usually several dm. high; stipules 6–8 mm. long, free; petioles 6–10 mm. long, the oblong leaflets several to 8 cm. long, acutish or obtuse, reticulate beneath; racemes subsessile, ovoid, scarcely more than 2.5 cm. long, the crowded flowers nodding, about 8 mm. long, on pedicels 2 mm. long or shorter; banner pubescent; calyx-teeth longer than the tube; pod 12 mm. long, half as broad.

San Martín: Pampas near Tarapoto, *Ule 6535* (det. Harms); *Williams 5801; 5833; 6523; 6524*. Brazil to the Guianas, and Colombia.

35. CENTROSEMA DC.

Rather similar to *Clitoria* but the leaves sometimes palmately 5–7-foliate or with a solitary leaflet, the calyx campanulate, the lower tooth often elongated, the banner usually shortly keeled or lightly gibbous above a claw, the nearly as long keel suborbicular, the style glabrous at the tip or the stigmatic portion puberulent, the pod usually subsessile, margined or winged (or with 2 nerves

along the edge) and with many oblong separated seeds. The genus is probably artificial; the name has been conserved against *Bradburya*.

Leaves with a single sagittate leaflet.....*C. sagittatum.*

Leaves with 3 leaflets or if rarely with only 1, this not sagittate.

Leaflets, at least mostly, 5–6 cm. wide to much wider; bractlets broad, inclosing the shorter calyx; hilum linear.

Stems lineately wing-margined; bractlets obtuse.

Pods about one-third as broad as long; stipules broad. *C. triquetrum.*

Pods much narrower in proportion to width; stipules narrow. *C. roseum.*

Stems merely striate.

Bractlets obtuse; pods 1 cm. wide or wider.

Bractlets shorter than calyx.....*C. latidens.*

Bractlets much longer than calyx.....*C. Plumieri.*

Bractlets acuminate; pods narrower.....*C. prehensile.*

Leaflets, at least most of them, much narrower; bractlets often narrower than ovate, longer or shorter than the calyx; hilum small (cf. *C. prehensile*).

Calyx-teeth subequal, narrow, all longer than the tube. *C. virginianum.*

Calyx-teeth unequal.

Lower calyx-tooth subulate and somewhat longer than the tube.

Pods straight.....*C. macrocarpum.*

Pods curved.....*C. capitatum.*

Lower calyx-tooth 4 mm. long, about equaling the tube. *C. brasilianum.*

Centrosema brasilianum (L.) Benth. Ann. Naturh. Hofmus. Wien 2: 118. 1838. *Clitoria brasiliana* L. Sp. Pl. 753. 1753.

Like *C. macrocarpum* but typically with glabrous linear leaflets, broadly falcate ovate bractlets, these 8 mm. broad, the lower calyx-tooth subequaling the tube or only 4 mm. long.—Probably both *C. pubescens* Benth., which compare under *C. macrocarpum*, and the latter could appropriately be considered as varieties of the Linnaean plant.

Loreto: Prov. Pucate, (*Raimondi*, det. Dahlem). Warm South America.

Centrosema capitatum (Rich.) Amsh. Med. Bot. Rijks Herb. Utrecht 52: 63. 1939. *Clitoria capitata* Rich. Act. Soc. Hist. Nat. Paris 1: 111. 1792.

Apparently scarcely distinguishable in flower from *C. macrocarpum* but glabrous or glabrate; flowers 2 cm. long, creamy white or the banner striped with purple; pods linear, strongly curved, 1–1.5 dm. long, 6 mm. broad, glabrate at maturity.

Loreto: Iquitos, *Killip & Smith 27411* (det. Killip). Guianas.

Centrosema latidens Killip & Macbr., spec. nov.

Suffruticosum, volubile; caulibus striatis, sparse et breviter hispidulis demum glabratis; stipulis ovatis, acutis, ut videtur circa 8 mm. longis; petiolis elongatis; petiolulis circa 5 mm. longis dense hirsutulis; foliolis late oblongo-elliptico-ovatis, basi oblique rotundatis, apice subabrupte caudato-acuminatis, 15 cm. longis, 7–8 cm. latis fere membranaceis, ubique imprimis subtus tenuiter reticulato-venulosis, subtus praecipue ad nervos minute vel obscure rufo-hirsutulis; racemis ad 10 cm. longis; pedicellis 3 mm. longis; bracteolis late ovatis, obtusis, vix 1 cm. longis, striatis; calyce 15–18 mm. longo, tubo 5 mm. longo, dentibus subaequalibus, ovatis, acutis vel late acuminatis, fere 1 cm. longis, dense rufo-puberulis; vexillo puberulo leviter gibbo, 2.5 cm. longo.—Allied to *C. dasyanthum* Benth. of Brazil but that species has oblong, acuminate leaflets about 4 cm. wide and very short racemes. Collectors noted the flowers as pinkish-purple with some yellow tinting.

Loreto: Iquitos, *Killip & Smith 27108* (type, U. S. Nat. Mus.).

Centrosema macrocarpum Benth. in Hook. Journ. Bot. 2: 59. 1840.

Young stems and petioles lightly pilose, finally glabrate; leaflets ovate, shortly acuminate, membranous but firm, prominently reticulate-veined especially beneath, 5–10 cm. long, 2.5–5 cm. broad, glabrous or nearly, borne on petioles about as long as the several-flowered peduncles, these 2.5–4 cm. long; bracteoles and shorter calyx-teeth subequal, 1–1.5 cm. long, the lower longer calyx-tooth to 1.5 mm. long; pods narrowly oblong, straight, margined, 2 dm. long or longer at maturity, glabrous or nearly.—The white or slightly pinkish softly pubescent flowers are 3–4 cm. long. *C. pubescens* Benth. is similar, but the leaves are typically, at least on the nerves, obviously pubescent beneath; cf. *C. brasilianum* (L.) Benth. The

species name has been "corrected" by some authors to read *macrocarpon.*

Loreto: Caballo-Cocha, *Williams 2189.* British Guiana; Colombia.

Centrosema Plumieri (Turp.) Benth. Ann. Naturh. Hofmus. Wien 2: 118. 1838. *Clitoria Plumieri* Turp. ex Pers. Syn. Pl. 2: 303. 1807.

Vigorous but rather slender-stemmed lightly hirsutulous or glabrate vine, the ovate-rhombic leaflets often several cm. broad and about 1 dm. long; racemes usually several-flowered, the purplish or reddish white corollas to 5 cm. long; banner calcarate; bractlets ovate, obtuse, to 2 cm. long, 1.5 cm. broad; upper calyx-teeth nearly obsolete, the 3 lower about 2 mm. long; pod oblong, glabrous, 1–1.5 dm. long, 1 cm. broad, the longitudinal ribs 2.5–3 mm. distant from the sutures.

Huánuco: Pozuzo, *4602.*—Junín: La Merced, *Killip & Smith 23766.*—San Martín: Lamas, *Raimondi.*—Loreto: Near Yurimaguas, (*Sandeman*). Widely distributed in Warm America. "Chucho de burro."

Centrosema prehensile Ducke, Notizbl. Bot. Gart. Berlin 11: 584. 1932.

More or less grayish pubescent with prehensile trichomes; stipules to 8 mm. long, lanceolate, striate; stipels subulate, 4–6 mm. long; petioles elongate with broadly oblong or lanceolate-ovate leaflets to 15 cm. long, 9 cm. wide, rounded or obtuse at base, gradually acuminate, finely and laxly reticulate, glabrate above; flowers few; bracteoles acuminate to 2 cm. long or longer; calyx to 1 cm. long, the lower tooth subequaling or longer than the tube; flowers typically white, the banner with violet spots, to 5.5 cm. long and nearly as broad; pods fide author similar to those of *C. brasilianum.*—In *Killip & Smith 29069* the petals are pinkish-white and the tip of the style is minutely and lineately puberulent, in this respect approaching *Clitoria;* the banner however is distinctly spurred above the claw. I was proposing this as a variety of *C. vexillatum* Benth. of the Guianas and Amazon but Killip has called to my attention the Ducke name; the plant of Bentham is soon glabrous, bractlets acute.

Loreto: Yurimaguas, *Killip & Smith 29069; 28191; 27950* (all det. Killip). Amazonian Brazil.

Centrosema roseum Huber, Bol. Mus. Goeldi 4: 570. 1906.

Stems ligneous below, glabrous, triangular, narrow-winged; leaves large, the acutely angled petioles 7 cm. long, the rachis 2 cm. long, the stipules linear-lanceolate, acute, 4–5 mm. long; leaflets broadly ovate or elliptic, 14–16 cm. long, 9–12 cm. broad, often subcordate at base, abruptly caudate (the acumen 10–15 mm. long), firm, membranous, glabrous above, puberulent on the nerves beneath, drying black; petiolules 5–6 mm. long; peduncles geminate, 7–14 cm. long, 5–8-flowered; bracts broadly ovate, deciduous, the elliptic or ovate bractlets 16–18 mm. long, 11–12 mm. broad, obtuse or apiculate, minutely puberulent; calyx broadly and obliquely campanulate, the lower tooth subequaling the tube, the nearly completely connate upper 2 a little shorter; banner a beautiful rose-violet color, retuse, to 4.5 cm. broad, densely rusty tomentose or subsericeous, not at all keeled but with sigmoid-incurved claw; pod (immature), 17 mm. broad, distinctly stiped, the sutural wings approximate, long (to 4 cm.) caudate.—Apparently from negs. nearly *C. platycarpum* Benth. as suggested by the author but may differ from the Brazilian species as the latter has, according to description, banner shortly gibbous and the pod wings distant; however, according to Ducke it is *C. triquetrum*. Illustrated, Huber, l.c. 571.

Loreto: Río Chipurana, Pampa del Sacramento, (*Huber 1550*, type).

Centrosema sagittatum (Humb. & Bonpl.) Brandg. ex Riley, Kew Bull. 344. 1923. *Glycine sagittata* Humb. & Bonpl. ex Willd. in Enum. Hort. Berol. 757. 1809. *C. hastatum* Benth. Ann. Naturh. Hofmus. Wien 2: 120. 1838.

Slender or the upper twining stems nearly filiform, glabrous or nearly, the long petiole of the hastate-cordate acuminate solitary leaflets conspicuously wing-margined, the wing discontinuous slightly below the junction of the leaf blade and there tipped by the two setaceous stipules; peduncles usually geminate, 2–several-flowered; bractlets 6–8 mm. long, acute; calyx-tube usually 6 mm. long, the narrow teeth about as long, subequal; flowers 2–3 cm. long; pods glabrous, obtuse, linear, to 10 cm. long.

Junín: La Merced, *5392*.—San Martín: Juanjuí, *Klug 4323*. Brazil and Patagonia to Central America and the West Indies.

Centrosema triquetrum Benth. Gen. Pl. 1: 528. 1865. *C. latissimum* Ducke, Archiv. Jard. Bot. Rio Jan. 3: 166. *pl. 13*. 1922.

Similar to *C. roseum;* stems, petioles and petiolules mostly distinctly depressed-winged; stipules as to type often 1, rarely 1.5 cm. long and nearly as broad; flowers pale rose, sometimes nearly white; banner calcarate; pods at maturity 12 cm. long, 4–5 cm. broad, tipped by the persisting curved subligneous style, this about 2 cm. long, the pod valves marginally biwinged; seeds 2, orbicular, 3 cm. long, 2.5 cm. broad, 3–4 mm. thick, greenish brown, slightly lustrous, about three-fourths circled by the filiform hilum (after Ducke).—Apparently this is *C. platycarpum* Benth. (cf. Mart. Fl. Bras. 15, pt. 1: 126. 1859) as to Peruvian material so named; the latter species according to Ducke has pods 17 cm. long, 3.5 cm. wide, the longitudinal wings as much as 1.5 cm. from the suture.

Woytkowski noted: "Clambers over trees to a height of 5 meters and announces its presence by the strong pleasant fragrance of the brilliant rose-purple blossoms; these are large and lovely and droop down in profusion and cover the ground beneath as they fall around the tree. The broad banner has a paler red margin with a slight brownish base on the outer side, the radiating veins form thick, nearly white stripes; the calyx is very pale green, the leaves dark green, polished. The older strong thick stems are triangular." F.M. Negs. 21824 (Spruce collections); 28029.

San Martín: Tarapoto, *Spruce 4906* (distr. as *C. platycarpum*); *Williams 5651.* Rioja, 900 meters, *Woytkowski 13* (det. Standl.).—Loreto: Yurimaguas, *Williams 4124.* Iquitos, *Tessmann 5152* (det. Harms). Mouth of Santiago, *Tessmann 4383* (affine, det. Harms). Brazil.

Centrosema virginianum (L.) Benth. Ann. Naturh. Hofmus. Wien 2: 120. 1838. *Clitoria virginiana* L. Sp. Pl. 753. 1753.

Herbaceous, the slender stems usually more or less pilose, the oblong-lanceolate to ovate leaflets often nearly glabrous, usually 1–2 cm. broad, 3–7 cm. long, acute or obtusish; racemes 1–4-flowered, the flowers blue or purple, 2.5 cm. long; calyx-tube about 2 mm. long, the linear-lanceolate, acuminate teeth subequal, 6–9 mm. long; pods 3–4 mm. broad, 7–12 cm. long, marginally ribbed.—*C. pascuorum* Mart., the leaflets linear-lanceolate, 8 mm. wide or narrower, seems to be merely a narrow-leaved form, var. *angustifolium* Griseb.

Cajamarca: Jaén, *Raimondi.*—Apurímac: On boulders along river, 2,450 meters, *Stork & Horton 10699* (distr. as *C. pubescens*).—Cuzco: Hacienda Santa Rosa, *Soukup 925* (distr. as *C. pubescens*). Encentro, Prov. Convenção, *Soukup 818.* Argentina to southern United States.

36. CLITORIA L.

Reference: Benth. in Mart. Fl. Bras. 15, pt. 1: 118–124. 1859.

Herbs or shrubs, sometimes low and suberect, sometimes climbing, with pinnately 3–many foliate leaves, the leaflets usually stipellate, the stipules striate and persisting as also the bracts and bractlets of the showy flowers, these variously disposed, the pedicels most often geminate. Calyx tubular (usually), the 2 upper lobes subconnate, the lower narrower. Banner ample, erect, explanate, narrowed at base, the wings falcate-oblong, the shorter keel acute. Vexillar stamen free, or more or less connate with the others. Stipules elongate, ordinarily bearded along the inner side. Pods stiped, narrow, compressed, the more or less coriaceous valves sometimes with a longitudinal rib, the free or separated seeds flat or globose.

Leaves with several leaflets.....*C. Ternatea.*

Leaves with 1–3 leaflets.

Bractlets and calyces subequal or somewhat unequal.

Leaves glabrous or more or less pubescent beneath.
C. amazonum.

Leaves softly short villous beneath.....*C. nervosa.*

Bractlets and calyces very unequal in length.

Vine, usually more or less villous.....*C. rubiginosa.*

Shrub or tree or high-climbing liana.

Bractlets 3–6 mm. long (typically); leaflets medium, glabrous or nearly.

Calyx densely silky pilose.....*C. pozuzoensis.*

Calyx sparsely puberulent pilose or glabrate.

Racemes short, usually lateral.....*C. javitensis.*

Racemes elongate, lax, often axillary...*C. leptostachya.*

Bractlets 8–10 mm. long; leaflets ample, somewhat pilose on nerves beneath.....*C. grandifolia.*

Clitoria amazonum Mart. ex Benth. Ann. Naturh. Hofmus. Wien 2: 115. 1838; 123.

Suffrutescent, apparently either erect or scandent, glabrous; petioles slender, 5–10 cm. long, stipules setaceous; leaflets ovate, sometimes oblong-ovate, more or less acuminate, typically broadly rounded at base, coriaceous and lustrous only in age, paler beneath

where rarely somewhat appressed pubescent, mostly 9–12 cm. long; peduncles rarely longer than 2.5 cm., fasciculate or branched, few-flowered; bracts ovate, 2–4 mm. long, the pedicels 6–8 mm. long; bractlets coriaceous, about 18 mm. long, subequaling the calyx; calyx-tube much longer than the acuminate or acute ovate teeth; banner white or pale roseate with darker veins, 6–8 cm. long; pod stiped, glabrous, 10–15 cm. long, 12–16 mm. broad.—Description after Bentham. As suggested by Bentham, l.c. 124, the species is variable and should probably include *C. arborea* Benth. (*C. Hoffmanseggii* Benth. l.c.) and *C. racemosa* Benth. l.c.; both are often somewhat more pubescent, especially the banner of the flowers, and the bracts are nearly as long as the pedicels, the former as to type with short-branched, densely flowered racemes, the bracts persisting in the latter, the racemes more elongate, the bractlets and calyces pubescent. Both, fide Ducke, are small or large trees with dark violet flowers. A tree to 30 meters high (Krukoff), his *5335* with pods 2 dm. long, 3.5 cm. wide. Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 33*.

The Woytkowski specimen has lightly pubescent banner 5 cm. long and broad, and calyces and bractlets both 2 cm. long; the collector noted it as a tree to 15 meters high with 3–5 flowers open in each large cluster of blooms, these purple blue, shading lighter to white within with a delicate fragrance suggesting that of vanilla; the leaves were very fragile, glossy green.

San Martín: Tarapoto, *Spruce 4523* (distr. as *C. racemosa*). Juanjuí, *Klug 4199; 3820* (det. Standl.). Near Moyobamba, *Klug 3505*. Near Rioja, *Woytkowski 25*(?).—Loreto: San Isidro, middle Marañón, *Tessmann 4953*. Iquitos, *Killip & Smith 30000*. Balsapuerto, *Klug 3105* (det. Standl., *C. javitensis*).—Río Acre: Mouth of Río Macauhán, *Krukoff 5335; 5719*. Brazil.

Clitoria grandifolia Ducke, Archiv. Jard. Bot. Rio Jan. 5: 141. 1930.

Robust shrub, semierect or climbing, the young branchlets rusty hispid, soon glabrate; stipules to 8 mm. long, lanceolate; petioles 1–2 dm. long, glabrous; leaflets oblong-ovate or elliptic, obtuse or rounded at base, acutely acuminate or mucronate-caudate, 1–3 dm. long, 5–12 cm. broad, becoming rigid-coriaceous, somewhat bullate-rugose and lustrous above, sparsely pilose on the prominent nerves beneath; racemes borne from the old wood, finally to 2 dm. long, the showy flowering portion densely flowered, brown pubescent with persisting subulate lanceolate bracts about 5 mm.

long, the pedicels and lance-acuminate bractlets 8 mm. long; calyx 3–4 cm. long, sparsely appressed pilose, the teeth long acuminate; flowers rose color, the banner 7–9 cm. long, yellow sericeous without; pods 2–3 dm. long, 2–2.5 cm. broad, densely reddish-tomentulose.—F.M. Neg. 18277.

Loreto: Near Iquitos, *Kuhlmann 18210*. Brazil.

Clitoria javitensis (HBK.) Benth. Journ. Linn. Soc. Bot. 2: 42. 1858; 123. *Neurocarpum javitense* HBK. Nov. Gen. & Sp. 6: 409. 1824.

Glabrous or nearly glabrous liana, with triangular lanceolate stipules about 5 mm. long and oblong or nearly oblong acuminate leaflets, usually 1–2 dm. long, about half as broad, lightly pubescent or glabrous beneath; racemes very short, usually on the old wood, the pedicels 5 mm. long; bractlets as to type, lanceolate, 3–4 mm. long; calyx lightly pilose, the tube 1.5 cm. long, the upper acuminate teeth 4 mm. long, the lower 7 mm. long; flowers nearly white to violet, the exteriorly pubescent banner to 5 cm. long; pods linear-oblong, to 2 dm. long, 2 cm. wide, coriaceous.—Sandwith, Kew Bull. 357. 1931, has included in var. *glabra* Sagot collections with longer bractlets and calyx-teeth, the banner glabrescent without; it is probable that the species concept should be broadened to include *C. grandifolia* and *C. pozuzoensis*. The following collections have bractlets less than half as long as the calyx; *Killip & Smith 28739; 29005*, with short racemes on slender terminal shoots, may be aberrant.

Loreto: San Antonio, middle Marañón, *Tessmann 3782* (det. Harms). Santa Rosa, *Killip & Smith 28739*. Lower Río Huallaga, *Killip & Smith 29005*. Balsapuerto, *Klug 3044* (det. Standl.); *Killip & Smith 28104; 28235*. Central America and northern South America.

Clitoria leptostachya Benth. Journ. Linn. Soc. Bot. 2: 43. 1858; 123.

Resembles *C. javitensis* and possibly is not distinct specifically but at least typically the racemes even when lateral are elongate, often a dm. long or longer, the rachis slender, the flowers geminate; bractlets small, in type 3 mm. long, the pubescent calyx-tube 2 cm. long with teeth 5–8 mm. long.

Loreto: Mishuyacu, *Klug 39; 464* (det. Killip). Brazil; Guiana.

Clitoria nervosa Herzog, Repert. Nov. Sp. 7: 56. 1909.

Shrub or small tree, the young branchlets puberulent; leaflets broadly ovate-elliptic, acute or shortly acuminate, chartaceous, finally glabrous and lustrous above, permanently softly and shortly villous beneath, the larger 11–17 cm. long, the bracts 7 mm. long, the pedicels 3–4 mm. long; bractlets subequal, the calyces 12–14 mm. long; calyx-tube about 1 cm. long, the lower tooth 7 mm. long; flowers light lilac color, the banner 3 cm. long, slightly pilose without; pods young, but evidently densely rusty appressed pilose.—In the Peruvian specimens the subequal bracts and pedicels are considerably shorter. The species in pubescence suggests *C. arborescens* Ait. of the Guianas, a species with much longer pedicels and calyces. *Killip & Smith 25136* is in fruit and therefore the determination is open to question; its pod is nearly 3 dm. long, 2.5–3 cm. wide, glabrous, not ridged.

Junín: Chanchamayo Valley, *Schunke 307; Killip & Smith 23380; 23416*. Río Perené, *Killip & Smith 25136*. Bolivia.

Clitoria pozuzoensis Macbr. Field Mus. Bot. 8: 103. 1930.

Shrub apparently erect, the branchlets and leaves glabrous or the latter minutely and sparsely hispid on the nerves beneath; petioles 4 cm. long; leaflets ovate, rounded at base, more or less gradually acuminate, 7–8 cm. long, about 3.5 cm. broad, or larger, pale green, chartaceous, prominently reticulate-veined beneath; racemes 3–4 cm. long, shortly peduncled, densely appressed pubescent with firm rusty trichomes; bracts broadly ovate, 3–4 (8) mm. long, often longer than the pedicel; bractlets oval, typically scarcely 1 cm. long; calyx-teeth nearly equal, broadly ovate, subobtuse, much shorter than the tube, this 18 mm. long; banner densely rusty sericeous pilose without, 6 cm. long.—This plant seems doubtfully distinct from *C. grandifolia* or *C. javitensis*.

Huánuco: Pozuzo, *4652*, type.—Junín: Río Pichis, *Killip & Smith 26795*.

Clitoria rubiginosa Juss. ex Pers. Syn. Pl. 2: 303. 1807; 118. *Clitoria glycinoides* DC. Prodr. 2: 234. 1825.

Herbaceous vine, the younger stems more or less spreading pilose, the older glabrate; stipules ovate-lanceolate, to 5 mm. long; leaflets ovate-elliptic, usually rounded at both ends and somewhat pubescent on the paler under surface, commonly 7–9 cm. long, 3–5 cm. broad; bracts broadly lanceolate, to 5 mm. long, the oblong

acute bractlets to 8 mm. long, about a third as broad; calyx 1.5–2 cm. long, the acuminate teeth 1 cm. long; flowers white or yellow, the exteriorly pilose banner 4–5 cm. long; pods glabrate, 3–5 cm. long, 6–8 mm. broad, medially ribbed.

Loreto: Manfinfa, *Williams 1137.* Near Iquitos, *Williams 8000; Klug 1189.* Yurimaguas, *Poeppig.*—San Martín: Tocache, *Poeppig 1872.* West Indies; Panama; South America.

Clitoria Ternatea L. Sp. Pl. 753. 1753.

Herbaceous vine with 2–3 (5) pairs of oval-elliptic glabrous leaflets, usually about 3 cm. long and somewhat narrower, rounded at each end, and several showy blue or rarely white flowers, the banner commonly 4–5 cm. long, the roundish bractlets less than half as long as the calyx, this 6–8 mm. long; pod lightly pubescent, to 1 dm. long, nearly 1 cm. broad.—Illustrated, Degener, Pl. Hawaii.

Lambayeque: Cultivated or escaped, *Raimondi.* Generally cultivated in the tropics.

37. COLOGANIA Kunth

Slender, herbaceous vines with pinnately 3-foliolate (rarely 1–5) leaves and red-purple flowers solitary, fascicled or short racemose in the axils. Leaflets stipellate, the persisting stipules, bracts and bractlets striate, usually lanceolate. Calyx tubular, with the teeth only 4, the upper 2 being nearly or completely connate. Banner obovate, broadly clawed, erect, complicate, the sides reflexed. Vexillar stamen free. Ovary stiped, many-ovuled, the shortly subulate style incurved, glabrous, the stigma capitate. Pod linear compressed, somewhat septate between the orbicular or subquadrate estrophiolate seeds.

Cologania pulchella HBK. Nov. Gen. & Sp. 6: 413. 1824.

More or less rusty villous, especially the stems above, petioles, leaves beneath and calyces, the trichomes typically retrorsely appressed; leaflets elliptic, oblong, obtuse at both ends, usually somewhat inequilateral at base, occasionally subrotund, 3–5 cm. long, 1.5–2.5 cm. broad; flowers geminate, sometimes solitary or 3, 22 mm. long, glabrous; calyx nearly 15 mm. long, the ovate-lanceolate teeth about 3 mm. long; pods 2.5 cm. long, 5 mm. broad, more or less villous pubescent.—The var. *rufescens* Micheli is the form with more or less spreading rusty pubescence.

Huánuco: Mito, stony slopes, *3332.*—Ancash: *Raimondi.*—Cuzco: Ollantaytambo, 2,850 meters, *Pennell 13686.* In rocky places, Quetepampa, *Vargas 9728.* Prov. Calca, *Vargas 127.*—Puno: Churumayo, *Soukup 548.* Bolivia to Mexico.

38. GLYCINE L.

Teramnus Sw.

Slender sublignescent vines, similar and allied to *Cologania,* but the banner of the racemose flowers spreading, the stamens all connate, and the alternate anthers reduced.—As in *Dioclea* the anthers sometimes partly infertile (*Teramnus*). The well-known "soybean" of cultivation is *G. hispida* Maxim.

Glycine uncinata (L.) Macbr., comb. nov. *Teramnus uncinatus* (L.) Sw. Prodr. 105. 1788. *Dolichos uncinatus* L. Sp. Pl. ed. 2. 1019. 1763.

More or less densely rusty pilose, the stems, petioles and rachis of the inflorescence retrorsely so; leaflets oblong-elliptic, somewhat one-sided toward the base, mostly 3–4 cm. long, 2–2.5 cm. broad, sometimes twice as large; calyx 6 mm. long, the teeth equal, linear lanceolate, longer than the tube; flowers reddish purple, about 6 mm. long; pod to 6 cm. long, about 3 mm. wide, densely villous with a hooked beak, reflexed at maturity.—*T. volubilis* Sw., to be expected, has only 4 calyx-teeth, the pods sparsely appressed pubescent, the beak oblique. Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 37.*

Huánuco: Pozuzo, on sunny brush, *4647.*—Junín: La Merced, *5231; Killip & Smith 23529.* Along Río Perené, *Killip & Smith 25236.*—San Martín: Near Moyobamba, *Klug 3630.*—Ayacucho: Aína, *Killip & Smith 23111.* Widely distributed in warm regions. "Trifolitos," "taconcitos."

39. PLATYCYAMUS Benth.

Lignescent plants with pinnately tri–many-foliate leaves, the leaflets ample, deciduously or persistently stipellate (stipules deciduous or none) and medium-sized papilionaceous flowers borne racemosely in terminal panicles. Bracts and bractlets small or minute, caducous. Calyx-lobes short, the upper connate but emarginate. Banner suborbicular, unappendaged; keel wings subequal, the petals free. Stamens, except the vexillar, connate; anthers uniform. Ovary sessile or nearly, many-ovuled; style

filiform with small terminal stigma. Pods large, broadly oblong, plano-compressed, 2-valved, the upper suture winged, or edged, the broadly reniform seeds estrophiolate.—In the Brazilian species *P. Regnellii* Benth. the pod simulates exactly that of *Phyllocarpus*.

Platycyamus Ulei Harms, Repert. Sp. Nov. 17: 444. 1921.

Tree, glabrous or nearly except for the long narrow inflorescence, the rachis of this lightly, the calyces densely brown villous; leaves elongate with the petiole even to 3.5 dm. long, with 4–5 pairs of petiolate leaflets, these oblong-lanceolate or ovate-obtuse, unless the terminal one at base, shortly acuminate, chartaceous, ordinarily 10–15 cm. long, 5–6 cm. wide; panicles 3–4.5 dm. long or longer, the branchlets 1–5 cm. long bearing approximately several pedicels 5–8 mm. long; calyx cupulate, silky villous within except at base, 10–12 mm. long, the lateral teeth ovate, the lower broadly lanceolate, 5 mm. long; corolla glabrous, the banner 15 mm. long, 11 mm. broad, the keel about as long; ovary shortly stiped; pods 11.5 cm. long, 2.5 cm. broad, chartaceous, lightly villous and reticulate, the dorsal suture slightly enlarged.—Tree 10–30 meters high, the lilac buds opening white. F.M. Neg. 2371.

Río Acre: *Ule 9469*, type.

40. ABRUS L.

Vines with slender more or less woody stems and abruptly pinnate many-foliolate leaves. Flowers roseate or whitish, the close fascicles in terminal or pseudo-axillary racemes. Calyx truncate, the teeth minute. Banner ovate, shortly clawed; keel curved, larger than the falcate wings. Stamens 9 (vexillar lacking), united into a sheath that is cleft above. Ovary subsessile, many-ovuled, the short uncurved glabrous style with capitate stigma. Pod compressed, 2-valved, partly divided between the seeds, the partitions thin.

Abrus precatorius L. Syst. Nat. ed. 12: 472. 1767.

Leaves commonly with 7–10 pairs of oblong-elliptic or sometimes slightly obovate leaflets, mostly 1 cm. long, half as broad, glabrate or often more or less appressed pubescent beneath; flowers 10–12 mm. long, the claw of the banner nearly free; pod 2.5 cm. long or somewhat longer, 12–14 mm. broad, densely short pubescent, the 3–5 ovoid or ellipsoid scarlet seeds usually black at base.—*A. tenuiflorus* Spruce of Brazil has the banner claw within the stamen tube, the pod subfalcate, 3–5 times longer than broad.

The seeds commonly serve for beads and the foliage is reputed used as a tea for coughs.—Illustrated, Fawcett & Rendle, Fl. Jam. 4, pt. 2: 43.

Junín: La Merced, *5365*. Widely distributed in the tropics. "Jequirity" (Brazil); "crabs eyes," "jumbi seed" (British West Indies).

41. CICER L.

Annuals or perennials with pinnate leaves, the rachis sometimes spinose or subcirrose at tip, the leaflets serrate as usually also the large stipules. Flowers small, white or purplish, axillary, solitary or few, the broad standard clawed, the wings free. Stamens 10, 1 free. Ovary sessile, the style incurved, glabrous, the pods turgid or inflated, ovoid-ellipsoid with 1 or several large seeds.

Cicer arietinum L. Sp. Pl. 738. 1753.

Erect more or less bushy and glandular pubescent annual, usually 3–4 dm. tall; leaflets 9–15 pairs, oblong-elliptic, obtuse, about 1 cm. long, half as wide; flowers solitary, long-pediceled, 6–8 mm. long, the sepals nearly as long as the corolla; pods 2–2.5 cm. long, about 15 mm. thick, apiculate by the persisting style; seeds 1 or 2, about 9 mm. broad, rugulose, pointed at one end, whitish, red or black.—Thought to be native to western Asia but long cultivated and especially popular in Spanish-speaking countries where usually used in soup. In English known as "chick-pea."

Ayacucho: *Weberbauer 5492*. Asia. "Garbanzo."

42. LATHYRUS L.

Reference: Burkart, Rev. Fac. Agron. y Vet. 8: 41–127. 1935.

Herbs commonly terminating in a tendril, the leaves pinnate, the leaflets usually few, entire. Stipules conspicuous or foliaceous, ordinarily more or less sagittate at base. Flowers variously colored or white, often showy, solitary or racemose on elongate axillary peduncles, the minute bracts promptly caducous, bractlets none. Calyx-tube often oblique at base or gibbous posteriorly, the teeth subequal or the upper shorter. Banner broad, emarginate, shortly clawed, the keel petals lightly adherent or free. Vexillar stamen free, or more or less connate with the others, the opening of the sheath not oblique. Style dilated above, longitudinally bearded on the inner face, otherwise glabrous. Pod campanulate or subterete, continuous within, many-seeded.

The "garden pea" is the related *Pisum sativum*, similar but the style ridged, dilated above, and the margins reflexed and coalescent so that it becomes flattened laterally, bearded on the inner edge. Possibly occurring as a weed or in cultivation introduced from the Mediterranean regions is the "lentil," or "lenteja," *Lens esculenta* L., a slender, erect or subscandent plant with several pairs of oblong leaflets with style of *Lathyrus*, 2 or 3 small, white flowers on a slender peduncle and a small, broad pod with 2 orbicular, sharp-edged lens-shaped seeds used for soup.

Perennial, the flowers usually 7–many.

Ovary pubescent; stipules semi-sagittate; foliage drying green. *L. longipes.*

Ovary glabrous; stipules sagittate; foliage drying black. *L. magellanicus.*

Annual; flowers 1–2 (3); leaflets linear, 2–3 mm. wide. . *L. crassipes.*

Lathyrus crassipes Gillies, ex H. & A. in Hook. Bot. Misc. 3: 198. 1833; 65. *L. stipularis* Presl, in Weitenweb. Beitr. 2: 30. 1837.

Typically glabrous with weak slender narrowly winged stems, 1–6 dm. tall; stipules sagittate; leaflets a single pair, linear, lanceolate, commonly 2.5–4 cm. long, 3–4 (7) mm. broad, the tendrils simple to trifid; peduncles 1–several cm. long, generally 2–flowered, the flowers subsessile; calyces glabrous, the 5 equal subulate teeth longer than the tube; flowers blue, about 1 cm. long; pods glabrous, straight, spreading, brown in color, 3–6 cm. long, 3–5 mm. broad, many-seeded, the blue seeds with broad hilum.

Huánuco: Mito, in weedy abandoned field, *3424*.—Cajamarca: Above San Pablo, 2,400 meters, (*Weberbauer 3832*, fide Burkart; 257). Cutervo, *Raimondi*. Chile to southern Brazil. "Alberjilla."

Lathyrus longipes Phil. Linnaea 28: 625. 1856; 81. *L. pubescens* H. & A. Bot. Beechey Voy. 21. 1831, as to Peruvian material.

Vigorous, typically smooth, trailing or when among other plants, climbing perennial from a thick root; stipules conspicuous, at least the lower sagittate, and often with 1 or 2 teeth; leaflets oblong, lanceolate, rounded or subacute but mucronulate, membranous, 4–10 cm. long, ordinarily about 1 cm. broad, the tendrils 1–5-parted; peduncles usually 1 dm. long or longer, bearing several–12 shortly pedicellate flowers (these 15–18 mm. long), the pedicels finally spreading or slightly recurving in fruit, 7–8 mm. long; calyces glabrous or pubescent, only the lower of the unequal teeth equaling

the tube; ovary pubescent; pods straight or lightly curved, to 6 cm. long, 8 mm. broad, the seeds not separated by a membrane.—The Peruvian collections have in part been referred to *L. pubescens* H. & A., 84, because of the somewhat pubescent foliage, but Burkart has shown that the Argentinean species has pods membranously septate between the seeds. The Peruvian plants with lightly pubescent foliage could be referred according to the Burkart revision to *L. subandinus* Phil. 83 as regards this character but are otherwise different and may therefore be proposed as *L. longipes*, var. **peruvianus** Macbr., var. nov., foliis plus minusve puberulis. Illustrated, Burkart, l.c. *pl. 16e* (calyx); *17o* (style). F.M. Neg. 32108.

Lima: Matucana, *2941; 327*. Río Blanco, *701; Killip & Smith 25170*.—Huánuco: Near Mito, *3445* (type, var. *peruvianus*).—Ancash: Above Samanco, (Weberbauer, 170). Near Andomayo, *Raimondi*.—Junín: Huancayo, *Ledig 26* (var.). Huariaca, *3112*. Near Tarma, (Weberbauer, 178).—Ayacucho: Yanamonte, 2,700 meters, *Weberbauer 5595* (var.).—Huancavelica: Yauli, 3,600 meters, *Goodspeed 10857*. Surcubamba, 2,500 meters, *Goodspeed 10342* (var.).—Apurímac: Pincos, *Goodspeed 10681*.—Cuzco: Marcapata Valley, 2,200 meters, *Weberbauer 7873* (var.). Apurímac River, *Goodspeed 11030*. San Salvador, *Vargas 123*. Valle del Urubamba, *Herrera 3420*. Yucay, *Soukup 731*.—Puno: Near Puno, *Soukup 417*. To Argentina and central Chile. "Purun poroto," "poroto silvestre."

Lathyrus magellanicus Lam. Encycl. 2: 708. 1786; 102.

Completely smooth perennial with the habit and general character of *L. longipes* but characteristically darkening in drying, the stipules as to type, all definitely sagittate and, especially, the ovary, glabrous; stems typically wing-margined; leaflets glaucous, often 5–7 cm. long, about 1.5 cm. broad, much exceeded by the stout several-branched tendrils; mature pod dark-colored, lustrous, 4.5–6 cm. long, usually 5 mm. broad; calyx-teeth all somewhat shorter than the tube.—Variable, two varieties apparently of little significance being var. *gladiatus* (Hook.) Kuntze, 107, the leaflets and stipules narrow, the former rarely 5 mm. broad, and var. *tucumanensis* Burkart, 108, robust like the type, but the lower calyx-teeth distinctly longer than the tube. *L. sessilifolius* H. & A., 114, "*sessiliflorus*" in error, is *L. magellanicus* as to Peruvian material so-named, but is doubtfully more than a variety, the leaflets greatly elongate, the calyx finely pubescent. Illustrated, Burkart, l.c. *pls. 13, 14* (var.). F.M. Neg. 28141.

Lima: Lomas de Pativilica, (*Raimondi*).—Huánuco: Near Huánuco, *2158*.—Cajamarca: Above Hualgayoc, 3,900 meters, *Weberbauer 3987* (var. *gladiatus*, det. Ulbr.). San Miguel (Weberbauer, 258).—Piura: *Weberbauer 6405;* 271 (var. *tucumanensis*, fide Burkart). Ecuador to southern Chile and Patagonia.

43. VICIA L.

Like *Lathyrus*, but keel petals coalescent, the staminal sheath oblique, the style slender, bearded only at the tip or all around the upper portion; pods 2–several-seeded. One species is erect.

Vines.

Flowers subsessile, solitary.....*V. lomensis.*

Flowers peduncled, rarely solitary.

Flowers scarcely exceeding 1 cm., usually shorter; leaflets narrow, usually cuspidately acute, rarely retuse or truncate. *V. graminea.*

Flowers longer than 1 cm.; leaflets usually cuneate, oblong, few if any of them acute.....*V. andicola.*

Stout erect annual.....*V. Faba.*

Vicia andicola HBK. Nov. Gen. & Sp. 6: 498. *pl. 582*. 1824.

Perennial, ligneous toward base, the striate-angled weak and sprawling younger stems as well as the leaf-rachi, peduncles and to a less extent the leaves more or less loosely pilose; leaflets typically 7–12, linear-lanceolate, obtuse but mucronate, subcuneate at base, 12–14 mm. long, 3 mm. broad, frequently 15–18 mm. long, 4–6 mm. broad; stipules lanceolate, subulate, entire; peduncles (2) 4 (6)-flowered, the well pedicellate flowers blue or violet and white, 12–15 mm. long; calyces lightly pilose, the narrow subequal lobes slightly shorter than the tube; ovary glabrous, the short style densely bearded at the tip (for a distance of 1 mm.) the long trichomes about equal in length; pods 4 cm. long, 8 mm. wide.—The Peruvian material is largely referable to var. **Matthewsii** (Gray) Macbr., comb. nov. (*V. Matthewsii* Gray, U. S. Expl. Exped. Bot. 1: 419. 1854), the stipules usually somewhat broader and slightly toothed, the style bearded for a distance of 1.5–2 mm., the trichomes progressively shorter below the tip; these differences however are variable. Possibly noteworthy as another var. is my collection, *3659*, var. **galbina** Macbr., var. nov., floribus flavo-viridis; ovario paullo adpresse piloso. This is doubtless the plant of Weberbauer,

260, west of Huambos, Cajamarca, referred by him to *V. Leyboldi* Phil. Linnaea 33: 51. 1864, of Chile, essentially glabrous species with much smaller flowers.

Mexia noted that the plant in Ecuador is used "in an infusion with the beak of a bird and the hoof of a tapir" for heart trouble. F.M. Negs. 2335 (*V. andicola*); 32107 (*V. Matthewsii*).

Piura: Near Huancabamba, *Raimondi.* Near Ayavaca, 3,200 meters, *Weberbauer 6320.*—Ancash: Ocros, 3,200 meters, *Weberbauer 5808;* 170 (distr. as *V. grata* Phil.).—Cajamarca: Above San Pablo, 2,400 meters, (Weberbauer, 257). Chorillos, *Raimondi.* West of Huambas, Weberbauer, 160, as *V. Leyboldi.*—Lima: Near Baños, and Obrajillo, *Wilkes Exped.* (type, *V. Matthewsii*). Purruchuca, *Matthews.* Obrajillo, *Pennell 14370.* East of Canta, 3,600 meters, *Pennell 14646.* Río Blanco, in rocks or shrubs, *658; 2963; Killip & Smith 21634.* Matucana, on shrubs, *366; Raimondi.*—Huánuco: Yanano, *3659* (var. *galbina*). Yanahuanca, *1246.* Chaglla, 3,100 meters, *Weberbauer 6695.*—Ancash: Pallasca, *Raimondi.*—Amazonas: Chachapoyas, (*Matthews*, fide Gray).—La Libertad: Huamachuco, 3,300 meters, brushy slopes, *West 8096;* open grassy slopes, 3,700 meters, *West 8186* (both det. Johnst.).—To Colombia and Venezuela. "Alberjilla."

Vicia Faba L. Sp. Pl. 737. 1753.

Robust erect smooth densely leafy annual, the 2–6 leaflets oblong, elliptic, usually 5–6 cm. long, 1–2 cm. broad, the terminal leaflet lacking, or sometimes replaced by a rudimentary tendril; flowers subsessile in the leaf axils, white with a large black or blue-black spot, about 2.5 cm. long or larger; pods at first erect, later pendent, cylindrical, to nearly 1 dm. long and 4 cm. broad, shortly pubescent, the large often flat seeds usually yellow or golden brown.

Commonly cultivated up to 3,700 meters (Weberbauer) for fodder, the beans also much used for food, as well as the young pods. Origin unknown, but probably native to Africa and southwestern Asia.

Huánuco: Mito, cultivated with corn, *1538.* "Avas," "broad-bean," "horse-bean."

Vicia graminea Smith in Rees, Cyclop. 37: no. 27. 1819. *V. bidentata* Hook. Bot. Misc. 2: 215. 1831. *V. acerosa* Clos, in Gay, Fl. Chile 2: 137. 1846. *V. grata* Phil. Linnaea 28: 622. 1856.

Glabrous or more or less loosely pilose or puberulent, the sprawling or climbing stems slender, weak; stipules lanceolate or short, semi-sagittate; leaflets characteristically linear, subulate and acutely mucronate, varying to narrowly oblong, and some of them more or less truncate or even retuse, commonly 2–4 pairs; peduncles laxly 2–5-flowered, typically about equaling leaves, the flowers rarely longer than 10 mm., shortly pedicelled; calyx-teeth subequal or the lower somewhat elongate, scarcely equaling or shorter than the tube; pod glabrous, ordinarily 2.5–3 cm. long, 5 mm. broad.

Monographic revision may show the species as interpreted here to be an aggregate; the more marked variations include *V. grata*, l.c. which may become var. **grata** (Phil.) Macbr., comb. nov., the slender peduncles often exceeding the leaves, the leaflets sometimes somewhat broader, even to 3 or 4 mm. wide, the calyces pubescent; *V. magellanica* Hook. f., Fl. Antarct. 257. 1844, seems to be the same. A form of the lomas near Lima with truncate or bidentate leaflets 2.5–3 cm. long, 4–5 mm. broad, is apparently *V. bidentata* Hook., l.c. (*V. Matthewsii*, var. *Lessoni* [Alef.] Macbr. Field Mus. Bot. 8: 103. 1930) which may become *V. graminea*, var. **Lessoni** [Alef.] Macbr., comb. nov. F.M. Negs. 2340 (var. *Lessoni*); 2339 (var. *grata*); 37518 (*graminea*).

Cajamarca: Nanchoc, (*Raimondi*).—Lima: Lurín, *Pennell 12211* (var. *Lessoni*); also *Hayne; Lesson.* Río Blanco, stony slope, *2965.* Above Lima, (Weberbauer, 169, as *V. grata*).—Junín: Palca, 2,700 meters, (Weberbauer, 178 & 248, both as *V. grata*).—Huánuco: Mito, trailing on grassy swale, *1736;* on shrubs, *1552; 1933.* Cani, in débris of stream-wood, *3381.* Near Huánuco, *3522.*—Cuzco: Sicuani, 3,650 meters, *Vargas 9830.* Prov. Calca, *Vargas 128* (var. *grata*). Near Cuzco, *Herrera 461; Vargas 210* (var. *grata*). Near Acomaya, *Vargas 9750* (var. *grata*). Valle del Urubamba, *Herrera 3391* (distr. as *V. Matthewsii*).—Puno: *Soukup 934; 948* (var. *grata*). Lake Titicaca region, (Weberbauer, 186). Tampa, (*Raimondi*). Mexico to Patagonia. "Kita-ttacco," "tarhui-tarhui," "alverjilla," "occoctijan" (Raimondi).

Vicia lomensis Macbr. Field Mus. Bot. 8: 102. 1930.

Diffuse or prostrate, glabrous or nearly glabrous annual, the slender stems 2–3 dm. long; stipules 2–4 mm. long, somewhat hastate, more or less angled-denticulate; leaflets often alternate, 5 (3) –7 pairs, oblong-obovate, truncate, retuse or irregularly denticulate apically, 5–6 mm. long, 2.5 mm. wide; tendrils simple;

flowers solitary, about 3.5 mm. long, subsessile or the pedicels in fruit scarcely 2 mm. long; calyces glabrate or slightly pilose, 2 mm. long, the subulate, acuminate teeth subequal; pod finally glabrous, 2–2.5 cm. long, about 6 mm. broad.—This may prove to be a glabrous state of *V. linearifolia* Hook. & Arn., Bot. Beechey Voy. 20. 1841, perhaps the earliest name for a group of closely related forms; cf. Reiche, Fl. Chile 2: 185–187. 1898. The Goodspeed collectors noted it as "very common, reminding one of the way white clover spreads in the north Temperate zone."

Lima: Lurín, trailing in rocky places in lomas by the sea, *5943*, type. Barranco, *Weberbauer 1656;* 145 as *V. humilis* HBK., a Mexican species. San Augustín, *Weberbauer 5236*. Atocongo, on all sandy-loam areas of entire lomas, 245 meters, *Mexia 04059; Stork, Horton & Vargas 9300* (both det. Johnst.).

44. PSORALEA L.

Shrubs or half shrubs, the Peruvian generally strict in habit, more or less pubescent and glandular-punctate; leaves digitately 3–several-foliolate, rarely pinnately divided or the leaflets 1. Stipules broad and setaceous; flowers usually blue and borne in axillary spikes, membranously bracted but the bracts often caducous. Calyx-lobes subequal or the lower larger, the upper 2 often connate. Petals subequal or shorter than the keel, the banner clawed, the wings oblong-subfalcate. Stamens 10, 9 united. Ovary sessile or shortly stiped, the style sometimes persisting and enlarged. Pod ovate, indehiscent or bursting irregularly. Seed more or less adherent to the pericarp.

P. glandulosa L., Sp. Pl. ed. 2: 1075. 1763, was accredited to Peru by the author; it seems clear however that it was based actually on the Chilian plant which is uniformly smooth or nearly, abundantly glandular, the flowers rather small. *P. lutea* Molina, Sagg. Chile, 163. 1782, and ed. 2: 145, 293. 1810, credited by Poiret, Lam. Encycl. 5: 685. 1804, to Peru or Chile is a synonym unless the name of Linné is to be taken as applying to one of the forms described below. Dahlem assigns all the many collections by Raimondi to *P. glandulosa*, an extreme viewpoint but the species do at times merge.

Flowers 8–10 mm. long when fully grown.

Stems above peduncles and rachis densely white villous-pilose.
P. pubescens.

Branches glabrate or more or less villous.

Calyces inconspicuously glandular, often remote.

var. *lasiostachys.*

Calyces densely glandular, crowded.....var. *potens.*

Flowers about 6 mm. long when fully grown.

Calyces usually sessile except in fruit, pubescent with black or mostly black trichomes.

Leaves glabrous beneath or lightly strigose, especially on the midnerve.

Branchlets more or less densely hispid with spreading or rarely subappressed trichomes.....*P. mexicana.*

Branchlets glabrous or nearly.....var. *maleolens.*

Leaves more or less ashy-pubescent beneath.....var. *Trianae.*

Calyces more or less pedicellate, ashy-pubescent...*P. divaricata.*

Psoralea divaricata Willd. Enum. Hort. Berol. 788. 1809.

Shrub with long-spreading branches, the flowering branchlets, peduncles and racemes more or less densely hirsute with spreading or subappressed ashy- or pale-fulvous trichomes; leaflets oblong-lanceolate, 3–5 cm. long, mostly 1–1.5 cm. broad, acuminate, nearly glabrous unless slightly appressed hispid beneath especially above the midnerve; petioles slender, about 2 cm. long, lightly pubescent to glabrous, the short petiolules densely hirsutulous; racemes about 7 cm. long including the peduncle, this 3–4 cm. long, narrow, scarcely 1 cm. broad, the flowers or fascicles rather remote; bracts caducous, ovate-lanceolate; calyces about 4 mm. long, slightly exceeded by the blue flower, shortly pedicellate, the pedicel however often concealed in the dense pubescence; fruiting calyx sparsely glandular, the pilose oblongish-apiculate pod well exserted.—One or two Ecuadorian collections approach *P. mexicana* var. *Trianae.* F.M. Neg. 1032.

Piura: Huancabamba, *Bonpland,* type. Ecuador.

Psoralea mexicana (L. f.) Vail, Bull. Torrey Club 21: 119. 1894. *Indigofera mexicana* L. f. Suppl. 335. 1781. *P. Mutisii* Kunth, Pl. Legum. 191. *pl. 54.* 1819; 224.

Shrub or small tree, abundantly leafy, 1–3 meters high, often much branched, the upper virgate branchlets as the axillary peduncles more or less densely hispid with black or dark-colored spreading trichomes; calyces 5 mm. long, equaled by the broad more or less promptly caducous bracts, sometimes shortly pedicelled,

always densely pilose, the trichomes mostly or all black; flowers blue, about 7 mm. long; otherwise similar to *P. divaricata* which could be treated as a variety.—The common form in Peru is var. **maleolens** Macbr., comb. nov. (*P. maleolens* Macbr. Field Mus. Bot. 4: 82. 1925), smooth or the peduncles and branchlet tips minutely strigillose. Better marked is var. **Trianae** (Vail) Macbr., comb. nov. (*P. Trianae* Vail, Bull. Torrey Club 21: 119. 1894; *P. munyensis* Macbr. Field Mus. Bot. 4: 84. 1925), the branchlets and leaves beneath more or less ashy tomentose or pilose, the trichomes appressed or rarely spreading. In extreme or typical states the varieties are distinct but they seem to merge in a large series of specimens; rarely the calyces are densely glandular.

At least the var. *maleolens* is employed as a substitute for tea and as a remedy for disorders of the stomach. F.M. Negs. 2031 (*P. Mutisii*); 28278 (*P. Trianae*).

Cajamarca: In shrubby woodland, 2,500 meters, south of Conchan, *Stork & Horton 10065* (var. *Trianae;* distr. as *P. pubescens*).—Ancash: Pampa Romas, *Weberbauer 3197* (var. *Trianae*).—Huánuco: Muña, edge of montaña, *3906* (type, *P. munyensis*). Tomaiquichua, on moist flats, *2436*. Sunny canyon slope, Yanano, *3736* (these last two forms with dense tomentose pubescence). Open canyon side, northeast of Huánuco, *2146* (var. *maleolens*). Panao, *4948* (var. *maleolens*). Mito, *1376* (type, *P. maleolens*).—Junín: Carpapata, above Huacapistana, edge of forest, 2,700 meters, *Killip & Smith 24428* (toward var. *maleolens*).—Cuzco: Lucmayo Valley, *Cook & Gilbert 1338*.—Without locality, *Dombey 854*. North to Colombia. "Coling imbra," "coling," "culem," "culim," "trinitaria."

Psoralea pubescens Pers. Syn. Pl. 2: 347. 1807. *P. marginata* Meyen, Reise 1: 436. 1834.

Tall shrub, the upper branchlets and peduncles typically short-villous with white or ashy trichomes, those of the calyces dark-colored or black; foliage similar to that of *P. divaricata*, the leaflets often somewhat larger; spikes frequently a dm. or two long, usually rather laxly flowered; calyces sessile or nearly, about 7 mm. long, more or less glandular, the glands sometimes stiped; flowers when full grown 10 mm. long or nearly twice the length of the calyx.—Two varieties evidently not constant may be distinguished: var. **lasiostachys** (Vog.) Macbr., comb. nov. (*P. lasiostachys* Vog. Nov. Act. Acad. Leop.-Carol. 19: Suppl. 1: 13. 1843; *P. remotiflora*

Macbr. Field Mus. Bot. 4: 113. 1925; *P. Featherstonei* Macbr. l.c. 84), the branches glabrate or more or less villous, the partly remote calyces inconspicuously if at all glandular; var. **potens** Macbr., comb. nov. (*P. potens* Macbr. Field Mus. Bot. 4: 85. 1925; *P. lasiostachys* var. *potens* Macbr. l.c. 8: 88. 1930), the crowded calyces densely glandular, the glands often stiped. Except as noted the following material is var. *lasiostachys*. Used as a remedy for indigestion. Plants, especially the var. *potens*, with very disagreeable odor. Common in central and southern Peru, 2,500 to 3,400 meters. F.M. Negs. 1033 (*P. lasiostachys*); 1034 (*P. marginata*).

Lima: Chosica, river valley, *500* (typical; Weberbauer, 148). Above Obrajillo, open rock bank, 2,700 meters, *Pennell 14371*. Matucana, shrubby slope, *406* (type, *P. Featherstonei*); *Stork & Horton 9138*.—Amazonas: Moyobamba, (*Sandeman*).—Huánuco: Mito, *1375* (var. *potens*). Huánuco, *Kanehira 94* (var. *potens*).—Ayacucho: Huanta, 2,800 meters, *Killip & Smith 23324*. Tambo, Prov. de La Mar, 3,100 meters, *Weberbauer 5550*.—Junín: Tarma, stream bank, 3,000 meters, *Killip & Smith 21918;* hedge rows, *Stork 10947; Killip & Smith 21776; 21946* (all var. *potens*); *1022* (type, *P. potens;* Weberbauer, 180, as *P. glandulosa*). Ocopa, thicket, 3,300 meters, *Killip & Smith 22007*. Huancayo, rocky hillside, 3,300 meters, *Killip & Smith 23357* (var. *potens*).—Huancavelica: Salcabamba, shrub land, *Stork & Horton 10266*.—Arequipa: Tingo, open rock slopes, *Pennell 13146* (type, *P. remotiflora*). Chachani Mountain, *Hinkley 60*.—Apurímac: Abancay, *Vargas 470*. Huancarama, *West 3774*.—Puno: *Soukup*.—Cuzco: Calca, *Herrera 2088* (toward var. *potens*). Paucartambo Valley, *Herrera 1131*. Valle del Urubamba, *Herrera 3416;* (Weberbauer, 243, as *P. glandulosa*). Lucmayo Valley, *Cook & Gilbert 1366*. Ollantaytambo, *Cook & Gilbert 266; 267*. San Sebastián, *Pennell 13632* (var. *potens*). "Coling macho," "cedron," "huallhuahuallhus" (fide Vargas), "mulahuatana" (West), "huagllhua" (C. & G.), "huayllana" (C. & G.).

45. DALEA Vent.

Parosela Cav.

Glandular-punctate shrubs or herbs, the Peruvian usually perennial, often half-shrubs with spreading or sprawling stems or branches. Leaves pinnate, the stipules setiform or glanduliform. Flowers more or less papilionaceous, generally some shade of blue or blue and white, sometimes yellow or reddish-yellow, racemose or spi-

cate, the spikes sometimes capitate, the bracts often conspicuous but frequently caducous. Calyx-teeth subequal. Petals clawed, the lower longer than the banner. Wing and keel-petals in the Peruvian species inserted at base or on the stamineal tube. Stamens 9 or 10 (rarely 5, 7 or 8), monadelphous. Ovary sessile or stiped, 2 (3) -ovuled. Stigma capitate. Pod usually included, often indehiscent and 1-seeded.—Besides the following, *D. multifoliolata* (Clos) Reiche of northern Chile may possibly occur; on the basis of its merely narrow-based somewhat thick petals and exserted pods it has been separated as *Errazurizia* Phil. It has tomentose stems, laxly flowered spikes. The name *Dalea* is conserved.

As indicated by me, Field Mus. Bot. 8: 84. 1930, my tentative revision was unsatisfactory; the following synopsis is scarcely more definitive; several of the forms proposed as species reduced outright may prove with more material to be at least recognizable as varieties, while several accepted because imperfectly known are doubtfully valid. The characters of pubescence and to some extent of habit, at present regarded as indicating specific values in order to avoid a general reduction in names before the plants are better understood, are certainly characters in themselves of questionable merit.

Besides the following a specimen by Raimondi from Cayacati, Cajamarca, was referred in herb. Dahlem to *D. brachystachys* Gray of North America, in all probability a misdetermination.

Annuals; flowers included or as long as calyx.

Tall, glabrous; stamens 10.

Bracts subpersisting, glabrous toward tip.....*D. leporina.*

Bracts caducous, puberulent.....*D. alopecuroides.*

Low, somewhat pilose; stamens 5.....*D. moquehuana.*

Perennials, usually more or less woody below, or shrubs.

Calyx-lobes ovate-based, shorter than the tube, the tips of the lobes, if subulate, not or little exceeding the bases of the lobes.

Flowers yellow (in some tone) sometimes aging reddish-violet or brown-violet, rarely purple-violet, the calyces then glabrous without or with a very few trichomes, even at anthesis.

Spikes subcapitate or in fruit somewhat longer than broad, but even then rarely 1.5 cm. long; flowers small. *D. microphylla.*

Spikes soon elongating, oblong-cylindrical, finally often several cm. long; flowers 8–12 mm. long.

Leaves glabrous or the pubescence fine, sparse.

Calyces densely villous; leaflets completely glabrous. *D. galbina.*

Calyces glabrous or nearly, as also the mature leaves at least above..... *D. cylindrica.*

Leaves, as calyces, permanently villous..... *D. sulfurea.*

Flowers violet, the petals edged with yellow.... *D. rubricaulis.*

Flowers blue or blue-violet often partly white; calyces villous to glabrate (in age).

Leaflets permanently ashy villous both sides.. *D. Weberbaueri.*

Leaflets glabrous or if more or less pubescent never densely at least above at maturity.

Perennial herbs, the stems erect or prostrate-ascending, woody only toward the base; calyx-lobes as usually the tube, villous; bracts usually more or less promptly caducous, shortly caudate-acuminate.

Bracts shortly caudate-acuminate, promptly caducous; calyces conspicuously long-villous.

Bracts pilose; leaflets oblong-elliptic.... *D. Pennellii.*

Bracts glabrous; leaflets oblong-linear.... *D. Smithii.*

Bracts persisting or tardily deciduous or, if caducous, the acumen as long as the bract or nearly; calyx pubescence moderate.

Stems prostrate-ascending.

Flowers about 10 mm. long.. *D. exilis, D. boliviana.*

Flowers about 6 mm. long..... *D. peruviana.*

Stems erect (at least the upper branches).

Leaves loosely pilose; flowers 7 mm. long.. *D. antana.*

Leaves appressed puberulent or glabrous; flowers 10–12 mm. long.

Calyx-teeth ovate-aristate. *D. pazensis, D. Sawadae.*

Calyx-teeth minute..... *D. Onobrychis.*

Shrubs, usually erect (*D. catatona* prostrate); bracts long-persisting.

Flowers 8–10 mm. long; erect or spreading shrubs.

Calyx-teeth, as tube, early glabrate.

Calyx-teeth (the longer 2 mm. long) rigid; bracts glabrous, persisting.....*D. Sawadae.*

Calyx-teeth minute; bracts pubescent.
D. Onobrychis.

Calyx-teeth and tube densely villous.

Plants moderately glandular; leaves glabrate.
D. nova.

Plants conspicuously glandular; leaves glabrous.
D. myriadenia.

Flowers about 6 mm. long; branches prostrate.
D. catatona.

Calyx-lobes subulate-filiform or if ovate-based the narrow tips (at least the lower) as long as or longer than the lobe-bases and usually than the calyx-tube.

Spikes all peduncled, oblong-cylindrical, soon elongate.

Leaves glabrous, or if somewhat pubescent, green at least above.....*D. caerulea.*

Leaves densely gray pubescent.....*D. sericophylla.*

Spikes at least in part subsessile, capitate or subcapitate.

Leaves densely pilose.....*D. trichocalyx.*

Leaves glabrous or nearly.....*D. microphylla.*

Dalea alopecuroides Willd. Sp. Pl. 3: 1336. 1803.

Erect glabrous (except spikes) annual with striate more or less glandular-tubercled stems sometimes a meter high, often much lower; stipules subulate; leaflets many, oblong, 5–10 mm. long; peduncles terminal and opposite the leaves; spikes dense, 2–8 cm. long, about 8 mm. thick; bracts narrowly ovate, acuminate, caducous, often pale, lightly pilose; calyx pilose, 3 mm. long, the lanceolate-subulate teeth nearly as long as the tube; flowers white or rose- or lilac-tinted; stamen tube straw-colored; pod apically pilose.—This is Rydberg's interpretation; apparently very similar if indeed distinct is *D. leporina* (Ait.) Bullock, which compare, of southwestern United States to Guatemala but, according to Rydberg, the flowers are blue, staminal tube dark-colored, bracts dark and glabrous above. In view of the known range the identification by herb. Dahlem of the following collections may be open to question.

Ancash: Huaraz, (*Raimondi*).—Cajamarca: Surcos, (*Raimondi*). —Lima: Surco, (*Raimondi*). Mississippi Valley and southward.

Dalea antana Macbr., spec. nov.

Perennis ut videtur; caulibus herbaceis suberectis strictis superne plus minusve pilosis; stipulis setaceis, pilosis, 4 mm. longis; foliis 3–4 cm. longis plerumque 19-foliolatis plus minusve dense praecipue subtus cum pilis patentibus pubescentibus, fere oblongis, minute cuspidatis, circa 6 mm. longis, 2.5 mm. latis; spicis terminalibus oblongo-cylindraceis demum 4–6 cm. longis; bracteis persistentibus suborbiculatis abrupte caudato-aristatis glabris mediocriter glandulosis; calycibus dense villosis haud glandulosis vix 5 mm. longis, laciniis ovato-subulatis circa 1.5 mm. longis; floribus violaceis 6 mm. longis.—Probably allied to *D. pazensis* and apparently with similar habit but flowers nearly as small as those of *D. peruviana* from which the spreading pubescence and different leaves distinguish it.

Cuzco: Limatambo, Prov. Anta, 2,700 meters, *Vargas 502*, type.

Dalea boliviana Britton, Bull. Torrey Club 16: 259. 1889. *Parosela boliviana* (Britton) Macbr. Contr. Gray Herb. 65: 1922. *Dalea tapacariensis* Harms ex Kuntze, Rev. Gen. 3: 59. 1898.

Sprawling perennial herb, the stems prostrate-ascending at base, finally more or less erect; branchlets lightly pilose becoming glabrous, sparsely (rarely densely) glandular; stipules setaceous; leaves usually 2–3 cm. long with 5–8 pairs of subsessile cuneate or mostly oblong-elliptic minutely apiculate or retuse-apiculate leaflets 3–5 mm. long, 2–3 mm. broad, glabrous or nearly above usually at least faintly puberulent and more or less glandular-punctate beneath; spikes well-peduncled in age, several cm. long; bracts more or less pilose, shortly caudate, persisting; calyx villous, obscurely bilabiate, the somewhat unequal teeth about 1.5 and 2 mm. long, ovate at base, but subulate-tipped, at least slightly shorter than the tube; banner typically blue or purple, 8–10 mm. long, the petals or keel usually white.—The var. *Herrerae* Macbr., Candollea 7: 222, seems to be a glabrous form, only the leaf-rachis and branchlets minutely pilose. In *Weberbauer 5526*, the leaves are conspicuously black-glandular. Cf. *D. exilis* (and note to it) which is probably the earlier name. *D. pazensis* Rusby, Mem. Torrey Club 3, pt. 3: 18. 1893, seems to be a more erect plant, the leaves typically somewhat pilose both sides, calyx more distinctly bilabiate.

Ayacucho: 3,000 meters, near Ayacucho, *Weberbauer 5526* (var.). Vicinity of Pucuhuillca, *West 3661*.—Cuzco: San Sebastián, rocky slope of canyon, 3,300 meters, *Pennell 13602* (type, var.

Herrerae). Ollantaytambo, *Cook & Gilbert 322* (var. *Herrerae*). Huasao, 3,200 meters, *Herrera 3042*.—Puno: Near Puno, 4,000 meters, *Soukup 404*.—Arequipa: Mt. Chinuta, in sandy loam on rocky slope, *Eyerdam & Beetle 22122?* Bolivia; Argentina. "Ccera."

Dalea caerulea (L. f.) Schinz & Thellung, Mém. Soc. Neuchât. Sci. Nat. 5: 370. 1913. *Galega caerulea* L. f. Suppl. 335. 1781. *Parosela caerulea* (L. f.) Macbr. Contr. Gray Herb. 65: 23. 1922. *D. Mutisii* Kunth, Mim. 161. 1824. *Dalea ayavacensis* HBK. Nov. Gen. & Sp. 6: 486. 1823. *Parosela ayavacensis* (HBK.) Macbr. Field Mus. Bot. 4: 86. 1925. *Dalea astragalina* HBK. l.c. 484. *P. astragalina* (HBK.) Killip ex Macbr. l.c. 109. *D. longispicata* Ulbr. Repert. Nov. Sp. 2: 6. 1906? *Dalea cutervoana* Szysz. in Rozpr. Akad. Uniej. Krakov. ser. 2. 9: 221. 1895.

Usually moderately pubescent to nearly smooth, openly branched shrub; leaves several, often 6 cm. long with commonly 6–8 pairs of oblong-elliptic leaflets, these often more or less narrowed at base, usually rounded and minutely apiculate apically, glabrous or sometimes more or less puberulent above, characteristically sparsely to densely pilose beneath, rarely glabrous, mostly 10 mm. long (15), about half as wide; peduncles shorter than the subtending leaves; spikes oblong after first anthesis, elongating even to 2 dm.; bracts and calyx-tube typically glabrous, the former persisting, the latter at throat, as also the subulate-filiform teeth, densely pilose-ciliate; calyx-teeth 3–5 mm. long, at least as long as the tube, usually more or less flexuose; flowers blue to violet, the banner sometimes yellowish or white or with 2 green spots, this suborbicular, about 1 cm. long, or scarcely half as long in smaller-flowered forms, long-clawed as also the petals; ovary more or less pilose.—This may be an aggregate as described but more probably the species is variable in characters of pubescence and flower size; the large-flowered race seems to be *D. ayavacensis*, the spikes of which in flower are 2.5–3 cm. wide. It grows along streams or in thickets. *D. longispicata* is probably a variety distinguishable by more rigid calyx lobes scarcely longer than the tube; *D. astragalina* seems to be intermediate in this and other characters and apparently grows in drier more open places than the large-flowered form. F.M. Negs. 725 (*D. ayavacensis*); 730 (*D. astragalina*); 2036 (*D. longispicata*).

Cajamarca: Cutervo, (*Raimondi, D. cutervoana*). Contumaza, Nanchoc, (*Raimondi*).—Piura: Ayavaca, *Bonpland*, (type, *D. ayavacensis*).—Libertad: Open shrubby country, 2,800 meters, Cachicadan,

Stork & Horton 9959 (*D. longispicata*, as to calyx).—Ancash: Between Pichiu and Conín, Prov. Huari, 3,500 meters, (*Weberbauer 2924*, type, *D. longispicata*). Urcon to Corongo, (*Raimondi*).—Junín: Chanchamayo, *Isern* (Weberbauer, 177; 246). Above Huacapistana, *Killip & Smith 24333; 24289*.—Amazonas: Chachapoyas, *Mathews*.—Huánuco: Shishmay, 3,000 meters, *Woytkowski 120*. Southeast of Huánuco, *2085*. Below Ambo, *2427*. Tambillo near Panao, *3576*. Carpish, along stream, 2,850 meters, *Stork & Horton 9930*.—Ayacucho: Open hillsides, 3,200 meters, Pampalca, *Killip & Smith 22219*. Huanta, (*Raimondi*). Choimacota, evergreen bushwood, 3,000 meters, *Weberbauer 7580*.—Apurímac: Near Río Apurímac, *Weberbauer 5570*. Abancay, 2,800 meters, *Vargas 1264* (distr. as *D. nova;* flowers small).—Cuzco: Convençion, (*Raimondi*). North to Colombia.

Dalea catatona Macbr. Candollea 7: 222. 1937. *Parosela catatona* Macbr. Field Mus. Bot. 4: 105. 1927.

Low shrub with several to many prostrate sparsely branched stems 1–2 dm. long; branchlets sparsely pubescent with spreading trichomes, soon glabrous, obscurely glandular-punctate; stipules setiform, about 3 mm. long; leaves 5–7 mm. long, 7–9-foliolate, the leaflets obovate-oval, more or less involute, about 2 mm. long, 1 mm. broad, obtuse or rounded, glabrous above, slightly and patently pilose beneath; spikes scarcely 1 cm. long, the 3–5 flowers about 6 mm. long; bracts ovate-acuminate, nearly 3 mm. long, somewhat pubescent, little shorter than the lightly strigillose calyx; calyx-teeth ovate-acuminate, densely pilose, shorter than the tube; petals purple, banner yellow-white, minutely red-dotted.

Huánuco: Chasqui, in shallow soils, about 3,500 meters, *1770*, type.

Dalea cylindrica Hook. Bot. Misc. 2: 213. 1831. *Parosela cylindrica* (Hook.) Macbr. Field Mus. Bot. 4: 112. 1927. *Dalea calocalyx* Ulbr. Repert. Nov. Sp. 2: 10. 1906. *D. samancoensis* Ulbr. l.c. 8. *Parosela calocalyx* (Ulbr.) Macbr. l.c. 104.

Perennial herb, the simple or nearly simple branches often subdecumbent at base, attaining several dm., slightly pilose, soon glabrescent; leaves sparsely glandular with 4–7 pairs of oblong-oval or obovate leaflets, these 6–15 mm. long, 2–5 mm. broad, glabrous and eglandular above, the younger sparsely pilose as well as glandular beneath, glabrous in age; stipules persisting, setiform, 5–7 mm. long;

spikes 2–8 cm. long on peduncles as long or longer, the flowers violet with light-colored banner or sometimes at first yellow, in age brownish-violet; rachis glabrous or rather sparsely pilose; bracts oval, more or less persisting, glabrous or pilose toward the acumen, about as long as calyx; calyx 5–6 mm. long, glabrous or very sparsely pilose, densely so on margin within, glandular between the ribs; petals somewhat exserted on the long claws; pod more or less pilose.—The bracts and calyx in the type of *D. calocalyx* vary from glabrous to slightly pubescent; its flowers were noted by the collector as being at first yellow, fading brownish-violet. The material from southern Peru seems to be a form or variety with violet flowers. *D. samancoensis* l.c. may become *D. cylindrica* var. **samancoensis** (Ulbr.) Macbr., comb. nov., marked by a short-villous rachis, puberulent younger leaflets; there are intermediate specimens difficult to place. F.M. Negs. 2033 (*D. calocalyx*); 2039 (*D. samancoensis*).

Cajamarca: Cayacati, Cascas and Contumazá, (*Raimondi*).—Ancash: Between Samanco and Huaraz, 3,000 meters, *Weberbauer 3136* (type, *D. samancoensis*).—Lima: Near Matucana, 2,370 meters, *Weberbauer 192* (type, *D. calocalyx*); 166. San Buenaventura, *Pennell 14549*. Along Río Chillón above Obrajillo, *Pennell 14374*. Canta, (*Cruckshanks*, type).—Ayacucho: Coracora, 2,900 meters, *Weberbauer 5798*.—Arequipa: *Williams 2523; Wilkes Exped.; Douglas;* gravelly river bed, 2,500 meters, *Pennell 13155; 13153*. Baños de Taparza, (*Raimondi*).—Moquehua: Carumas, rainy-green formation, *Weberbauer 7291*.

Dalea exilis DC. Prodr. 2: 247. 1825. *Parosela exilis* (DC.) Macbr. Field Mus. Bot. 4: 103. 1927.

Glabrous, from type specimen apparently sprawling, the stems remotely branched; leaves about 2.5 cm. long with about 11 (9–13) oblong-elliptic cuspidate petiolulate leaflets 4.5 mm. long, 1.5 mm. wide; spikes well-peduncled, ovate, about 1 cm. long; bracts suborbicular, abruptly caudate; calyx densely villous, the tube about 2.5 mm. long, the shorter lobes lanceolate-subulate; flowers about 8 mm. long, the wings slightly longer than 3 mm., evidently blue. —Notwithstanding my remarks, Field Mus. Bot. 8: 85. 1930, it seems probable that this is the same as *D. boliviana;* the specimen is young but the flowers are rather large, and the bracts are probably persistent. The diverse bracts mentioned by DeCandolle are unquestionably abnormal. Nearly the same is *D. onobrychioides* Griseb. of Argentina with, at least as to type, calyx lobes nearly as

long as calyx tube, the bracts with acumen subequaling the body of the bract. F.M. Neg. 6944.

Peru(?): Without locality, *Pavón*.

Dalea galbina Macbr. Candollea 7: 222. 1937. *Parosela galbina* Macbr. Field Mus. Bot. 4: 104. 1927.

Nearly glabrous, erect, strict or remotely branched shrub 1–1.5 meters high; branchlets slender, moderately glandular-tuberculate, glabrous or with a few more or less spreading trichomes; leaves 8–10 mm. long, 7–11-foliolate, the oblong-elliptic leaflets slightly cuneate at base, obtuse, about 2 mm. broad, 5 mm. long, somewhat fleshy, punctate both sides, glabrous; spikes oblong, 4–6 cm. long, scarcely 1 cm. thick, the peduncle densely glandular and strigose below the flowers; bracts subrotund, abruptly cuspidate, strongly convex, densely glandular, minutely strigose, about 3 mm. long; calyces villous-hirsute, moderately glandular-tuberculate, 2 mm. long, the subulate teeth scarcely as long, about 0.5 mm. broad at base; flowers greenish-yellow, nearly 1 cm. long, the banner with two green spots on the lower half, about 6 mm. long.

Huánuco: Near Huánuco, rock outcrops, 2,500 meters, *3500*, type.

Dalea leporina (Ait.) Bullock, Kew Bull. 196. 1939. *Psoralea leporina* Ait. Hort. Kew. 3: 81. 1789. *Parosela leporina* (Ait.) Rydb. N. Amer. Fl. 24: 78. 1920.

Glabrous annual becoming several dm. high, the long branches ascending; leaves 5–10 cm. long with numerous (usually more than 20) oblong-elliptic leaflets 5–10 mm. long, rounded or retuse at apex; peduncles elongate, the dense cylindrical spikes several cm. long to 1 cm. thick; bracts ovate-lanceolate, acuminate, with scarious white margins, subpersisting, glabrous toward the tip; calyx-tube turbinate, softly pilose, about 2.5 mm. long with subulate lobes about equaling the tube; flowers usually blue, 2–2.5 mm. long; pod pilose. —The calyx may be more deeply cleft on the back at least as to the Peruvian specimens, which may be found to be separable. The similar *D. alopecuroides* Willd. has caducous, scarcely margined puberulent bracts and apparently has been found in South America as near as Bolivia if not actually (see above, p. 364) in Peru.

Apurímac: Ambay, Prov. Abancay, 3,200 meters, *Vargas 772*. North to southwestern United States.

Dalea microphylla HBK. Nov. Gen. & Sp. 6: 482. 1823. *Parosela microphylla* (HBK.) Rose, Contr. U. S. Nat. Herb. 10: 106. 1906.

Branched shrub, sometimes sprawling, usually less than 1 meter high, typically glabrous except the subsessile or shortly peduncled short or subcapitate spikes, these with more or less pilose bracts, densely villous calyces; leaves 2–3 cm. long with 2–7 pairs, sometimes more, of oblong obtuse or retuse leaflets typically minute (1–2 mm. long), usually about 5 mm. long, half as broad; spikes 1–1.5 cm. long; calyx-teeth subulate from an ovate base, nearly to quite as long as the tube; flowers yellowish-red, 6–7 mm. long.—The var. **brevis** Macbr., comb. nov. (*P. microphylla*, var. *brevis* Macbr., Field Mus. Bot. 4: 103. 1927), is aberrant in its somewhat shorter (2–2.5 mm. long) bracts, broader shorter calyx lobes 1.5 mm. long, the calyx-tube 2 mm. long; the var. **vicina** Macbr., comb. nov. (*P. vicina* Macbr., l.c.), is probably only distinguishable by the presence of a few long spreading trichomes on the younger leaves; the type seems undeveloped, the spikes thus small, subglobose. F.M. Neg. 726.

Piura: Huancabamba, *Bonpland*, type. Negritos, Valley of the Pariñas, *Haught F-81*. Valley of the Quiros, 1,800 meters, *Weberbauer 6350* (var. *vicina*).—Cajamarca: Valley of the Río Huancabamba, 1,100 meters, *Weberbauer 7119* (var. *brevis*).

Dalea moquehuana Macbr., spec. nov.

Annua stricta erecta, circa 1 dm. alta; foliis paucis 2.5–3 cm. longis, rachis pilosis; foliolis plerumque 4-jugis, oblongo-obovatis, retusis, 6–8 mm. longis, 3–4 mm. latis, glabris; pedunculis circa 1 cm. longis; spicis ad 2 cm. longis oblongo-cylindraceis; bracteis sparse puberulis longe caudato-acuminatis 4.5 mm. longis; calycibus minute glanduloso-punctatis dense villosis fere 4 mm. longis, laciniis setaceis circa 2 mm. longis; vexillum album 3.5 mm. longum (cum ungue); alis ut videtur nullis; carina cum ungue fere 4.5 mm. longa ad circa 2.5 mm. cum tubo staminali connata violacea; staminibus solum 5; ovario superne dense piloso.

If the flowers examined are normal and interpreted correctly this delicate annual seems to connect the genera *Dalea* and *Petalostemon;* in spite of the 5 instead of 10 stamens it is best, it seems to me, included in *Dalea* because of the attachment of the keel petals, the aspect and the range; *Petalostemon* is found so far as known only north of Central America.

Moquehua: Between Moquehua and Torata, rainy-green formation, 2,000 meters, *Weberbauer 7433*, type.

Dalea myriadenia Ulbr. Repert. Nov. Sp. 2: 9. 1906. *Parosela myriadenia* Macbr. Field Mus. Bot. 4: 108. 1927.

Low shrub, strikingly tuberculate-glandular throughout, and completely glabrous except for the more or less densely pilose calyx and sometimes evanescently puberulent youngest branchlets; leaves 1.5 to 3 cm. long with 5–8 pairs of thickish cuneate oblong petiolulate leaflets about 5 mm. long, 1.5–2 mm. broad; spikes 2–5 cm. long, the violet-blue flowers 10–12 mm. long; bracts nearly orbicular, abruptly caudate-apiculate, strongly convex, 7–8 mm. long; calyx about 4 mm. long, the minute subulate teeth nearly concealed in the dense marginal pubescence; banner 8 mm. long, white with violet base, the petals violet-blue; pod densely glandular-tuberculate and pilose apically.—F.M. Neg. 731.

Amazonas: Balsas, *Weberbauer 4279*, type; 190.

Dalea nova Ulbr. Repert. Nov. Sp. 2: 5. 1906.

Shrub, the tips of the long branches, young leaves and bracts lightly pilose; leaves 2–5 cm. long with 5–8 mostly 6 pairs of oblong-elliptic obtuse leaflets, the mature glabrous ones 10 mm. long, nearly half as wide; spikes elongating to 1 dm.; calyx densely pilose, about 3 mm. long, the ovate apiculate teeth minute; banner orbicular to 7 mm. long with claw 2–3 mm. long, the petals nearly as long-clawed; pod pilose, to 3 mm. long.—Description after Ulbrich. F.M. Neg. 732.

Cajamarca: Above San Pablo, 2,400 meters, *Weberbauer 3838*, type; 257.

Dalea Onobrychis DC. Prodr. 2: 247. 1825.

Erect, glabrous, except the villous branchlet tips; stipules setaceous; leaves with 4–6 pairs of elliptic submucronate leaflets, punctate beneath; peduncles 4 times longer than the leaf; spikes ovate cylindraceous, densely villous, the ovate concave setose mucronate bracts somewhat longer than the villous calyces; flowers violet.—Description after DeCandolle (after negative); peduncle to 12 cm. long; leaves 4 cm. long, the petiolulate leaflets nearly 1 cm. long, 6 mm. broad; calyces at least finally lightly villous, the glandular punctae visible, the teeth much shorter than the tube; flowers 8–10 mm. long. As indicated by DeCandolle, the type plant may not be Peruvian, but the following collections seem to accord except *Weberbauer 6854*, with longer calyces and larger flowers. F.M. Neg. 6946.

Lima: Río Blanco, open hillside, 3,000 meters, *Killip & Smith 21702.* Matucana, *347; 244.* Without locality, "misit *Lagasca,*" type.—Arequipa: At 3,400 meters, *Weberbauer 6854*(?).

Dalea pazensis Rusby, Mem. Torrey Club 3, no. 3: 18. 1893. *Parosela pazensis* (Rusby) Macbr., Contr. Gray Herb. 65: 23. 1922.

Tall, erect, woody toward the base, the long slender subherbaceous or herbaceous upper branches minutely pubescent; stipules setaceous; leaves about 4 cm. long with 6–10 pairs of oblong elliptic rounded but cuspidate leaflets, mostly 9 mm. long, 2.5–3 mm. wide, typically appressed puberulent both sides; spikes well-peduncled, at first ovate, elongating oblong-cylindrical; bracts scarious margined, slightly pilose, filiform caudate, the caudation nearly as long as the body of the bract; calyx silky pilose, 4 mm. long, the ovate shortly aristate teeth about a third as long as the tube; flowers dark blue or indigo blue, partly white.—Var. **Vargasii** Macbr., var. nov., foliis ubique glabris; bracteis caduceis vel subpersistentibus. This plant, apparently common in Cuzco, does not seem to differ except as noted from the typical form.

Huancavelica: East of Mejorada, sandy gravelly soil, 2,400 meters, *Stork & Horton 10913.*—Apurímac: Abancay, *Vargas 1263* (var.).—Cuzco: Valle del Urubamba, 2,800 meters, *Herrera 3421* (var.). Chicón Canyon, 2,900 meters, *Vargas 11067* (type, the var.). Calca, *Vargas 687* (var.). Bolivia.

Dalea Pennellii Macbr. Candollea 7: 223. 1937. *Parosela Pennellii* Macbr. Field Mus. Bot. 4: 107. 1927.

Similar to *D. boliviana;* leaves mostly 9–11-foliate, the oblong-oval leaflets 6–10 mm. long, about 3 mm. wide, more or less appressed strigillose both sides, rather obscurely punctate beneath; bracts promptly caducous, long-acuminate, densely and softly pilose as the shorter calyces; calyx-tube about 3 mm. long, the scarcely half as long lobes subulate-tipped; flowers 10–12 mm. long, the type mulberry purple except for the pale yellowish-white banner.

Arequipa: Arequipa, open sandy soil, 2,500 meters, *Pennell 13171,* type.

Dalea peruviana Macbr. Candollea 7: 223. 1937. *Parosela peruviana* Macbr. Field Mus. Bot. 4: 106. 1927.

Perennial, the subherbaceous soon glabrous flexuous stems prostrate or diffuse, 1.5 to 4 dm. long, simple or remotely branched;

stipules filiform, 4–6 mm. long; leaves 2–4 cm. long, 7–15-foliolate, the oval or obovate-oblong leaflets rounded at apex, usually 3–5 mm. long, 1.5–2.5 mm. broad, glabrous; spikes well-peduncled, becoming oblong-cylindric, 3.5 cm. long; bracts suborbicular, glabrous, caudate-acuminate; calyx densely villous, the narrow acuminate teeth 2–3 times shorter than the tube; flowers about 6 mm. long, the wings blue, the banner white; ovary hirsute.—Nearly *D. humifusa* Benth. of Ecuador, but that species more or less pubescent.

Lima: Matucana, in firm granitic slope, *301*.—Huánuco: Ambo, *3193*, type. Yanahuanca, *1167*. Huánuco, stony slope, *3507*.—Junín: Tarma, heavy stony soil, *1016; Killip & Smith 21790*. Huancayo, *Killip & Smith 22028*.—Ancash: Chiquián, *Weberbauer 2852*. Bolivia.

Dalea rubricaulis Ulbr. Meded. Rijks Herb. Leiden 27: 50. 1915.

Similar to *D. cylindrica* but when well-developed a half-shrub several dm. high; stems glandular, often reddish; leaflets glabrous, 12–18 mm. long, 1–1.5 mm. broad, revolute; calyx densely pilose. —F.M. Neg. 733.

Arequipa: Near Arequipa, *Williams 2523*. Bolivia.

Dalea Sawadae Macbr. Candollea 7: 222. 1937. *Parosela Sawadae* Macbr. Field Mus. Bot. 11: 24. 1931.

Much-branched shrub, the lower stems sometimes prostrate but typically forming hedge-like masses several dm. high; branches puberulent, finally glabrous, sparsely glandular; stipules setaceous; leaflets mostly 11, petiolulate, elliptic, 3–8 mm. long, 2–5 mm. broad, glabrous above, puberulent beneath; spikes long-peduncled or sometimes subsessile, ovate in bud, soon oblong-cylindrical, 4–8 cm. long; bracts glabrous, at least except the short caudation, typically persisting; calyx-teeth unequal, glabrous or nearly, the ovate base rigidly or nearly spinately subulate-aristate, about 2 mm. long, subequaling the strongly nerved and early villous tube; flowers about 8 mm. long, sometimes white, except for the purple banner. Perhaps will prove to be a variety of *D. boliviana* (or *D. exilis*).

Cajamarca: Chota, 2,400 meters, *Stork & Horton 10053*. Celendín, 2,625 meters, *Woytkowski 5*.—Huánuco: Near Huánuco, *Sawada P119*, type. San Rafael, *Sawada P112*.—Junín: Uspachaca, *1302*.

Dalea sericophylla Ulbr. Repert. Nov. Sp. 2: 7. 1906. *Parosela Fieldii* Macbr. Field Mus. Bot. 4: 111. 1927. *Dalea Fieldii* Macbr. Candollea 7: 222. 1937.

Laxly branched shrub densely ashy silky villous nearly throughout; leaves 1.5–2.5 cm. long with 3–7 pairs of oblong-oval acute leaflets 6–9 mm. long, 2–3 (5) mm. broad; spikes well-peduncled, more or less nodding from the ends of the branchlets, finally 4–6 cm. long; bracts lance-setaceous, 6–8 mm. long, densely pilose, slightly exceeding the calyx, this with subulate lobes 2 to nearly 2.5 mm. long, about as long as the tube; flowers nearly 10 mm. long, the keel and wings blue, the banner yellowish-white.—*D. Fieldii* was established especially on the 5–7 pairs of leaflets instead of 3–4 as described for *D. sericophylla;* examination of the type of the latter shows the character to be of no significance. *D. Killipii* Macbr. of Ecuador has subsessile spikes.

Cajamarca: Hualgayoc, in open shrubs, 3,100 meters, *Weberbauer 4017*, type; 261. Chota, (*Raimondi*).—Junín: Huariaca, shrubby canyon side, *3117* (type, *D. Fieldii*); *3108*.

Dalea Smithii Macbr. Candollea 7: 223. 1937. *Parosela Smithii* Macbr. l.c. 5: 370. 1934.

Nearly *D. Pennellii;* leaflets glabrous above, sparsely or obscurely puberulent but densely punctate glandular beneath, nearly oblong, subtruncate and minutely mucronulate apically, mostly 7–10 mm. long, 1.5 mm. wide; bracts glabrous or glabrate, shortly and abruptly caudate; calyx-lobes ovate-based, subulate-tipped, scarcely a third as long as the densely villous tube, this about 3 mm. long.

Ayacucho: Anco, Río Mantaro Valley, in thickets, 2,500 meters, *Killip & Smith 22180*, type.

Dalea sulfurea Ulbr. Repert. Nov. Sp. 2: 5. 1906. *Parosela sulfurea* (Ulbr.) Macbr. Field Mus. Bot. 4: 104. 1927.

Perennial herb or half shrub, the more or less villous branches procumbent-ascending; leaves 2–3 cm. long with 4–5 pairs of oblong-oval petiolulate leaflets densely villous beneath, finally lightly so above, 6–7 mm. long, 2–3 mm. broad; stipules 6–7 mm. long; spikes oblong, about 2 cm. long, shortly peduncled, the sulphur yellow flowers nearly 12 mm. long; bracts ovate-lanceolate, 4–5 mm. long, sparsely glandular, glabrous; calyx 4–5 mm. long, villous except the short teeth, these glabrous, 1–1.5 mm. long; banner about 7 mm. long; pod silky villous, glandular.—F.M. Neg. 735.

Cajamarca: Below San Miguel, 2,200 meters, *Weberbauer 3922*, type; 188.

Dalea trichocalyx Ulbr. Repert. Nov. Sp. 2: 7. 1906. *Parosela trichocalyx* (Ulbr.) Macbr. Field Mus. Bot. 4: 102. 1927.

Slenderly branched shrub, sometimes attaining 1 meter, the uppermost branchlets bearing numerous shortly peduncled or subsessile spikes at their tips; branchlets, leaves and bracts more or less loosely pilose; leaves 1–3 cm. long with mostly 6 pairs of oblong-oval leaflets, 5–6 mm. long, about half as broad; flowering spikes subcapitate, about 1 cm. long, the sulphur yellow flowers reddish-brown in age; bracts oblong-lanceolate, about 5 mm. long; calyx 6–8 mm. long, densely villous, the filiform lobes as long as or slightly longer than the tube; banner 4 mm. long, shorter than the wings, the keel even 7 mm. long; ovary pilose.—Glands on bracts and calyx few and hidden by the pubescence. Not clearly distinct, sens. lat., from **D. carthaginensis** (Jacq.) Macbr., comb. nov. (*Psoralea carthaginensis* Jacq. Enum. Pl. Carib. 27. 1762; Sel. Stirp. Amer. Hist. 206. 1763); as remarked by me, l.c., and by Killip, Journ. Wash. Acad. Sci. 26: 359. 1936, probably only one variable species is concerned for this group; but cf. Rydb. N. Amer. Fl. 24: 12. 1920. According to Killip, the Jacquin type has essentially glabrous branches and leaves, these with 4–6 pairs of leaflets. Notwithstanding this author's clear presentation of the case for the conservation of *Parosela*, his reasoning did not prevail. *D. Killipii* Macbr. of Ecuador would key here but has the oblong spikes of *D. caerulea*, the pubescent leaves of *D. sericophylla*.

Ancash: Near Huaraz, 2,200 meters, *Weberbauer 2994*, type; 173.—Lima: Between San Bartolomé and Puente de Verrugas, *Weberbauer 5212*.

Dalea Weberbaueri Ulbr. Repert. Nov. Sp. 2: 9. 1906. *Parosela Weberbaueri* (Ulbr.) Macbr. Field Mus. Bot. 4: 105. 1927.

Leafy, appressed ashy-pilose shrub, usually about 1 meter high; leaves rarely 2 cm. long with 4–7 pairs of oval leaflets only 3–4 mm. long, 1–2 mm. broad; spikes terminal, 2–4 cm. long, the blue-violet flowers 10–12 mm. long; bracts caducous, broadly ovate-acute, pilose, 3–4 mm. long, nearly as broad; calyx densely pilose, about 3.5 mm. long, the subulate teeth 1–1.5 mm. long; banner 8 mm. long, slightly exceeded by the keel.—In my collection *1017*, the wing and banner were white turning purplish with age, the keel petals blue-purple; in Killip & Smith specimens the banner was white or greenish-white, deep blue at margin below. F.M. Neg. 2077.

Ancash: Chacchán, west of Huaraz, pendent from steep canyon sides, *2538.*—Junín: In rocks between Tarma and Palca, 2,600 meters, *Weberbauer 1739*, type; 176. Near Tarma, *Weberbauer 2371;* in heavy stony soil, *1017; Killip & Smith 21937; 21826.*

46. INDIGOFERA L.

Herbs usually more or less woody toward the base, or shrubs, with unequally pinnate or rarely 3-foliolate or simple leaves, the leaflets entire. Stipules usually setaceous. Flowers white, more or less marked with purple, borne in axillary racemes, the small calyx shortly 5-toothed. Banner suborbicular or obovate, sessile or shortly clawed, the wings narrowly oblong adherent to the keel, the petals of the latter often spurred laterally. Stamens 10, diadelphous, the anthers mucronulate. Ovary sessile or nearly, 1–many-ovulate; stigma capitate, frequently penicillate. Pod oblong to linear, angled or nearly cylindrical, the variously shaped seeds partitioned.—Genus noteworthy for *I. tinctoria* L., which, with *I. suffruticosa* was the source of the true indigo of commerce; both species were much cultivated in tropical lands before the manufacture of the dye synthetically. *I. campestris* Bong., of Brazil (det. Harms, "affine"), *Weberbauer 7189*, Atiquipa, just reported in press (courtesy Nelly Dubugnon), must be placed in addenda.

Leaves, especially the younger, glandular punctate beneath; pods 4–6 mm. long, the pubescence spreading.....*I. microcarpa.*

Leaves not at all or not obviously punctate; pods longer or if short, glabrate or the pubescence appressed.

Flowers 6–10 mm. long.

Leaflets more or less sericeous strigose, usually 5 mm. long, sometimes twice as large; plants prostrate.....*I. humilis.*

Leaflets often 2 or 3 times larger, often glabrous; plants ascending-erect.

Anthers glabrous.....*I. macrocarpa.*

Anthers with 3–4 bristles at tip.....*I. tephrosioides.*

Flowers 2–4 (5) mm. long.

Leaflets 1–3 pairs, cuneate-obovate.....*I. lespedezioides.*

Leaflets 2–several pairs, oblong-elliptic, little if at all cuneate at base.

Pods linear, scarcely more than 1 mm. thick, mucronate by the 1.5 mm. style; calyx teeth subulate, well exceeding tube.....*I. mucronata.*

Pods oblong-cylindrical, about 2 mm. thick, the style about 1 mm.; calyx teeth narrow, little or not at all exceeding tube.

Pods 1.5–2 cm. long and distinctly curved unless longer; leaves usually lightly strigose only beneath. (*I. tinctoria*), *I. suffruticosa.*

Pods straight or nearly, 2–4-seeded, 5–15 mm. long; leaves more or less ashy strigose, about equally both sides. *I. guatimalensis, I. truxillensis.*

Indigofera guatimalensis Moç., Sessé & Cerv. ex Prain & Baker, Journ. Bot. 40: 67. 1902.

Similar to *I. truxillensis;* branches and leaflets, these especially beneath, minutely ashy-strigose; calyx 1.5 mm. long; pod oblong, straight, 5–15 mm. long, the 2–4 seeds slightly round-angled.—Poeppig found it cultivated. Probably it should be included in *I. truxillensis.*

Peru: Without locality, *Poeppig 1572.* Central America; West Indies; Ecuador.

Indigofera humilis HBK. Nov. Gen. & Sp. 6: 454. 1824.

Sericeous strigose, the few–several more or less elongate simple or nearly simple stems prostrate; leaves 1–2.5 cm. long with 4–5 pairs of oblong or slightly obovate firm leaflets 4–8 mm. long, 2.5–4 mm. broad, often conduplicate; racemes with elongate peduncles 4–6 cm. long, the few flowers about 8 mm. long; calyx ashy-strigose, the subequal lance-acuminate lobes 2 mm. long equaling or exceeding the tube; banner strigose without; pod closely reflexed, ashy strigillose or typically glabrous, 2 cm. long, slightly angled, the 6 or 7 seeds quadrate.—Resembles greatly *I. macrocarpa* except in habit and denser pubescence, and is probably an ecological variant. There is a herbarium name by Ruiz and Pavón referring to the silvery color. F.M. Neg. 2046.

Cajamarca: Near Cajamarca, *Bonpland,* type. Nanchoc, (*Raimondi*).—Huánuco: Near Huánuco, *Kanehira 253;* prostrate on stony slopes, flowers brick red, *2347; 2322; 3257; Ruiz & Pavón.*—Libertad: North of Huamachuco, in loose stones, 3,350 meters, *West 8100* (det. Johnst.).

Indigofera lespedezioides HBK. Nov. Gen. & Sp. 6: 457. 1824.

Thick-rooted greenish gray shrub or half shrub, the virgate branches several dm. to a meter high; leaves usually about 4 cm.

long, sometimes twice as long, with normally 3–7 (occasionally 1-foliolate) cuneate-oblong or obovate sparsely strigose leaflets ordinarily about 2 cm. long, 8 mm. broad to twice as large, the lateral smaller than the terminal, usually mucronate and obtuse apically; racemes finally exceeding the leaves, the numerous flowers approximate, rose-colored, 6–7 mm. long; banner ashy strigillose, clawed; calyx about 3 mm. long, the lance-subulate teeth as long as or slightly longer than the tube; pod 2–3 cm. long with 8–10 seeds.—Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 5.*

San Martín: Tarapoto, *Williams 5841; 6518; Spruce 4510; Ule 6446.* Brazil and Bolivia to southern Mexico; West Indies.

Indigofera macrocarpa Desv. Ann. Sci. Nat. sér. 1. 4: 409. 1826. *I. obrajillensis* Gray, U. S. Expl. Exped. Bot. 1: 404. 1854. *I. laxa* Ulbr. Repert. Nov. Sp. 2: 4. 1906. *I. Weberbaueri* Ulbr. Repert. Nov. Sp. 2: 3. 1906.

Greenish gray perennial herb, the long laxly growing stems more or less woody toward the procumbent bases; leaves 4–7 cm. long with (3) 6–8 pairs of oblong-obovate rounded but mucronate leaflets usually about 1.5 cm. long, 5–8 mm. broad, not infrequently smaller, sometimes larger, more or less appressed strigose especially beneath; flowers scarlet to 10 mm. long, the banner lightly strigose, crowded at anthesis, the raceme with the elongate peduncle then about 8 cm. long; calyx strigose, the subulate acuminate teeth 3–5 mm. long, longer than the tube; pod deflexed, straight, canescent, 3–4 cm. long with several to 8 quadrate seeds.—Similar to *I. tephrosioides* HBK. but apparently as noted by Gray, distinct by virtue of the more pubescent leaflets and especially by the lack of bristles on the anther-cusp; but these "differences" ought to be proved. F.M. Negs. 2049 (*I. laxa*); 2054 (*I. Weberbaueri*).

Ancash: Above Ocros, 2,300 meters, *Weberbauer 2722;* 166; 173 (type, *I. Weberbaueri*). Huaraz, *Weberbauer 2996* (associated with type of *I. Weberbaueri*).—Cajamarca: Below San Pablo, 2,200 meters, *Weberbauer 3880;* 257 (type, *I. laxa*).—Ayacucho: Coracora, 2,600 meters, *Weberbauer 5820.*—Lima: Obrajillo, *Wilkes Exped.* (type, *I. obrajillensis*). Rocky slope along Río Chillón below Obrajillo, 2,400 meters, *Pennell 14435.* Open loamy slope, San Buenaventura, 2,800 meters, *Pennell 14502.* Open rocky slope, Canta, 2,900 meters, *Pennell 14349.* Matucana, pendent on gulch walls, *306; Raimondi.*—Without locality, *Dombey,* type.

Indigofera microcarpa Desv. Journ. Bot. 3: 79. 1814.

Decumbent branching strigose canescent half shrub, the pubescence somewhat spreading especially on the ascending branchlets, the leaves punctate beneath, the punctae frequently dark-colored and conspicuous; leaves ordinarily 3 cm. long with 4–5 pairs of obovate obtuse or emarginate minutely mucronulate leaflets mostly 8–10 mm. long, scarcely half as wide; racemes 5 cm. long, rather shortly peduncled, densely flowered, the flowers 3–6 mm. long, pinkish or purple; calyx hirsute, the nearly setaceous teeth longer than the tube; pod pendulous, ashy hirsutulous, 8–10 mm. long, torulose, with 2–4 seeds.—Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 6*.

Piura: Near La Brea, in green shrub formation, *Weberbauer 7759*. Nigritos, *Haught F102*. Talara, *Haught 20*.—Libertad: Chicama Valley, *Smyth 75*. Brazil to the West Indies. "Manoraton."

Indigofera mucronata Spreng. ex DC. Prodr. 2: 227. 1825.

Laxly growing pale-green but lightly strigose pubescent half shrub, the spreading branches sometimes a meter or two long; leaves about 1 dm. long with 5–7 (usually 5) thin elliptic leaflets 2 cm. long, half as broad or larger; racemes slender, often a dm. long or longer, the rather remotely borne flowers scarcely 5 mm. long; calyx teeth filiform or nearly, much longer than the tube; pod straight or slightly curved, not torulose, reflexed, sparsely strigose, many-seeded, 2.5–4 cm. long.—*I. subulata* Vahl. ex Poir. in Lam. Encycl. Suppl. 3: 150. 1813, is probably the correct name but Rydberg has remarked that the description calls for simple or trifoliolate leaves nearly as long as the racemes.

Tumbez: Hacienda Chicama, deciduous bushwood, 700 meters, *Weberbauer 7671*. Widely distributed in warm regions.

Indigofera suffruticosa Mill. Gard. Dict. ed. 8. 1768. *I. anil* L. Mant. 272. 1771.

Shrub often attaining a meter or two, the strict-angled stems and branches densely white strigillose as the leaves beneath, the latter usually glabrate at least in age above; leaves about a dm. long or longer with 9–15 elliptic to obovate leaflets, acute or obtuse and mucronate, usually 2–3 cm. long; racemes dense, 2–5 cm. long, shorter than the leaves; calyx scarcely 1.5 mm. long, strigose, the minute teeth shorter than the tube; flowers salmon-pink, 4–4.5 mm. long, the banner strigose; pod sickle-shaped, 1.5–2 cm. long, slightly torulose, reflexed, strigillose, with 3–7 seeds, these cylindric or some-

what angled.—Banner and keel greenish, wing bright orange to rose (Stork, Horton & Vargas).

Occasionally cultivated as a cover crop and then usually less pubescent; Ruiz & Pavón noted that "from this plant is extracted the indigo blue that is used in dyeing." The similar *I. tinctoria* L. of Asia, at one time introduced (found at Ica by Raimondi) into many tropical countries to furnish dye, may be recognized by longer, straight or nearly straight pods. Illustrated, Degener, Fl. Hawaii.

Cajamarca: Cascas and Cayacati, (*Raimondi*). Shapaja, *Belshaw 3346*.—San Martín: San Roque, *Williams 7705*.—Loreto: Río Nanay, *Williams 402; 403; 747*. Río Itaya, *Williams 3228*. Caballo-Cocha, *Williams 2239*. Pebas, *Williams 1585; 1927*.—Junín: Near Huacapistana, (Weberbauer, 246).—Ayacucho: Huanta, 2,800 meters, *Killip & Smith 23336*.—Apurímac: Prov. of Abancay, shrubland, 2,000 meters, *Stork, Horton & Vargas 10525* (distr. as *I. truxillensis*). Tropical and subtropical America; Africa; Asia. "Añil," "añil-añil," "llangua," "mutui," "mutui cube," "mutuy," "indigo."

Indigofera tephrosioides HBK. Nov. Gen. & Sp. 6: 455. *pl. 580*. 1824.

Similar to *I. macrocarpa* but the leaflets typically oblong, glabrous above, silvery beneath with appressed silky strigose pubescence, and, especially, the mucro of the anthers with a few bristles.—Perhaps the bristles are lacking on most specimens because they are caducous; the following material was determined at Dahlem.

Cajamarca: Cayacati, Chorillos and Chota to Taycabamba, (*Raimondi*).—Amazonas: Between Chachapoyas and Molino, (*Raimondi*). Ecuador.

Indigofera truxillensis HBK. Nov. Gen. & Sp. 6: 456. 1823.

Similar to *I. suffruticosa*, but usually with fewer leaflets (7–9), strigose on both surfaces; pod about 1 cm. long, long-arcuate and more gradually tapering to tip, usually 4-seeded.—Flowers greenish white, the petals red-purple edged. F.M. Neg. 2129.

Libertad: Truxillo, *Bonpland*, type.—Cuzco: Convención, *Herrera 15*.—Huánuco: Near Huánuco, gravelly river flat, *2366*. Huertas, rocky western slope, *1346*. Widely distributed. "Añil-añil."

47. BARBIERIA DC.

More or less lignescent vine or the long upper branches herbaceous with alternate odd-pinnate leaves and showy red flowers

borne in the upper axils or in terminal racemes, each subtended by a pair of bractlets. Calyx tubular, colored, with 5 subequal lobes. Flowers somewhat papilionaceous, the petals narrow, long-clawed; banner oblanceolate; wings shorter than banner and keel, the petals of the latter united above the middle. Upper stamens free, the others connate. Ovary sessile, many-ovuled, the long style bearded within, the small stigma terminal. Pod linear, straight, compressed, 2-valved, septate within, impressed without between the transverse oblong seeds.

Barbieria pinnata (Pers.) Baill. Hist. Pl. 2: 263. 1870. *Galactia pinnata* Pers. Syn. Pl. 2: 302. 1807. *Clitoria polyphylla* Poir. in Lam. Encycl. Suppl. 2: 300. 1811. *B. polyphylla* DC. Mém. Leg. 242. 1825. *B. maynensis* Poepp. & Endl. Nov. Gen. & Sp. 3: 58. 1845.

Branchlets more or less conspicuously hirsute, the trichomes spreading; leaves 1–2 dm. long with 15–23 oblong-elliptic petiolulate leaflets rounded at each end, apiculate at tip, usually about 3.5 cm. long, sometimes 5, 8–16 mm. broad, dark green and glabrous or sparsely hispidulous above, pale and more or less appressed pilose beneath; racemes remotely few-flowered, the lance-subulate bracts persistent; calyx bractlets lanceolate-acuminate, 8–10 mm. long; calyx-tube 1.5–2 cm. long, the setaceous-acuminate teeth about 1 cm. long; flowers 5 cm. long; pod hirtellous, usually 5 cm. long, 5 mm. wide, with 7–9 black seeds.—Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 9.*

Junín: Río Paucartambo Valley, 700 meters, dense forest, *Killip & Smith 25367* (det. Harms). La Merced, in thickets, *Killip & Smith 23758.*—San Martín: Tocache, *Poeppig 2367* (type *B. maynensis*); *Spruce 3852.*—Loreto: Balsapuerto, liana, with blood-red and white flowers, in clearing, *Klug 2978; 3095.* Yurimaguas, herbaceous vine, *Killip & Smith 27941* (det. Harms).—Cuzco: Cosñipata, 700 meters, *Weberbauer 6951* (det. Harms). Bolivia to Mexico; central Brazil; West Indies.

48. GALEGA L.

Smooth, erect but more or less flexuous-stemmed perennial with imparipinnate leaves, the leaflets many, and long racemes of white or blue flowers. Stamens connate at base into a tube. Style glabrous. Pods subterete, continuous within, the valves obliquely striate.—Otherwise like *Tephrosia.*

Galega officinalis L. Sp. Pl. 714. 1753.

Leaves 1–1.5 dm. long, the oblong lanceolate leaflets conspicuously setose-mucronate at the oblong or retuse apex, mostly 4 cm. long, 7–12 mm. broad; stipules semi-sagittate; flowers 10–12 mm. long on filiform pedicels as long as the persisting setaceous bracts, these about 5 mm. long.—Escaped from cultivation in Ecuador, Bolivia and elsewhere, to be expected in Peru.

Peru (probably). Southern Europe.

49. TEPHROSIA Pers.

Cracca L.

Shrubs or herbs with many of the characters of *Indigofera* but the keel petals not spurred and the anthers obtuse. Leaflets usually with veins obliquely parallel from the midnerve. Flowers red, purple or white in clusters of 2–6 on terminal racemes or these sometimes in the upper axils or opposite the leaves, bracted but ebracteolate. Calyx campanulate, the lower tooth usually longer. Petals clawed, the standard more or less silky pubescent without, the wings connate with the keel. Stamens 10, the uppermost more or less free. Pod flat beaked, the seeds not or scarcely partitioned. The name *Tephrosia* is conserved.

Tall, strict, velvety villous toward the inflorescence. . . . *T. toxicaria.*
Low-ascending, erect, more or less ashy strigose. . . . . *T. cinerea.*

Tephrosia cinerea (L.) Pers. Syn. Pl. 2: 328. 1807. *Galega cinerea* L. Syst. ed. 10: 1172. 1759. *Cracca cinerea* (L.) Morong, Ann. N. Y. Acad. Sci. 7: 79. 1892.

Sprawling to suberect more or less ashy-pubescent annual or often enduring and becoming a half-shrub with branches several dm. long; leaves 2–8 cm. long with several to 5 or 6 pairs of oblong or mostly somewhat oblanceolate leaflets, slightly cuneate at base, usually obtuse or rounded at apex, often mucronulate, appressed strigillose above or glabrous, similarly pubescent, but usually more densely, beneath, 1.5–4 cm. long, 4–8 mm. broad; racemes few, several-flowered, peduncle opposite the upper leaves; calyx 3–4 mm. long, cinereous with appressed or subappressed or mostly long trichomes, the subulate subequal teeth as long as or generally longer than the tube; flowers rarely 1 cm. long, purplish; pods about 5 cm. long, straight or slightly arcuate, finely appressed strigillose.—Variable as interpreted here; cf. Rydb. N. Amer. Fl. 24: 160.

1923. Var. *littoralis* Benth. in Mart. Fl. Bras. 15, pt. 1: 48. 1859, has denser spreading pubescence on petioles and branches. *T. purpurea* (L.) Pers., possibly to be expected in Peru as an introduction from the East Indies, is shrubby, glabrate, with 6–10 pairs of linear-oblong narrowly oblanceolate, glabrescent leaflets, short racemes, minutely pubescent calyx and shorter pods 3–4 cm. long.

Piura: Between Piura and Nomala, 200 meters, *Weberbauer 5935* (in part var. *littoralis*). Talara, *Haught 27*. Amotape Hills, Pariñas Valley, along watercourses, *Haught F104*.—Amazonas: Tupen, *Weberbauer 4777* (det. Ulbr., *T. purpurea*). Warm America.

Tephrosia toxicaria (Sw.) Pers. Syn. Pl. 2: 329. 1807. *Galega toxicaria* Sw. Prodr. 108. 1788.

Slender rusty pubescent shrub 1–3 meters high, the strict stem nearly velvety-pilose and subherbaceous above; leaves often 2–3 dm. long with 12–20 pairs of oblong leaflets rounded but mucronate at tip, petiolulate, appressed pilose at least beneath, 7 cm. long, 1.5 cm. broad, often smaller; racemes dense, terminal and axillary, 5–10 cm. long or longer in fruit, the fasciculate silky pilose flowers on pedicels 2–4 mm. long, subtended by setaceous acuminate caducous bracts; banner 1 cm. long or longer; pod silky villous, 5 cm. long, 4–6 mm. broad, straight or nearly, with usually 10–15 seeds.—Flowers whitish or a yellowish-green sometimes purplish at base or white except for the green banner, this with white edges.

Commonly used as a fish poison and cultivated for this purpose. In Convención its use is associated with a fiesta called "Cuti" (Herrera). The plant, especially the roots, is pounded finely and thrown on the surface of the quiet water; fish in the vicinity more or less paralyzed by the effect of the plant come to the surface and are then readily taken. Also used as an insecticide for coca; grown from seed and harvested about every three years (Killip & Smith).—Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 8*.

Huánuco: Pampayacu, *Kanehira*.—Junín: Cultivated along Río Perené, *Killip & Smith 25134*. Pichis Trail, 1,600 meters, *Killip & Smith 25489; 25719* (cultivated or escaped into thickets). La Merced, bushy slope, *5661*.—Ayacucho: Aina, *Killip & Smith 22300; 22558*.—Loreto: Balsapuerto, clearing, *Killip & Smith 28459*. Puerto Leguía, *Killip & Smith 27503*. Río Itaya, *Killip & Smith 29677*. Santa Rosa, *Killip & Smith 28811; Williams 4959*. Mishuyacu, *Klug 720; 1011*. Río Nanay, *Williams 441; 1267*. Widely distributed or cultivated in tropical and subtropical America.

"Barbasco," "tirana barbasco," "muyuy cube," "cube ordinario," "kkumu" (fide Killip), "tingui de cayenne."

50. SESBANIA Scop.

Herbs or rather low shrubs, the leaves abruptly pinnate with many entire leaflets. Stipules small, deciduous. Flowers loosely borne on axillary racemes, one bract at the base of the pedicels, a pair of bractlets below the calyx, both deciduous. Calyx shortly lobed, the lobes subequal. Flowers yellow or somewhat marked with purple (or in one species, white to red), the banner longer than the other petals, clawed. Keel incurved, obtuse, the petals long-clawed, often orbiculate. Stamens diadelphous, the free filament slightly bent below. Ovary subsessile, many-ovuled. Pod linear, somewhat compressed, beaked, the many seeds transversely separated. The related *Gliricidia sepium* (Jacq.) Steud., native of Central America, may be cultivated as a shade tree; it has imparipinnate leaves, the leaflets of medium size, and axillary racemes of lilac or pink flowers, the banner with a yellow or white spot.

Sesbania exasparata HBK. Nov. Gen. & Sp. 6: 534. 1824.

Glabrous, the long angulate branches subherbaceous above; leaves 2–3 dm. long, with many (to 50) oblong elliptic leaflets 1–2.5 cm. long, 3–6 mm. broad; flowers few, 2–2.5 cm. long on slender pedicels; calyx-tube 4–5 mm. long, the acuminate teeth shorter; pod linear, 2–2.5 dm. long, slightly torulose.—Plant with strong odor like tan-bark (Haught). The leaves collapse when irritated.

Other species of wide distribution that consequently may be found in Peru are *S. sericea* (Willd.) Link, and *S. Sesban* (L.) Britton, the former with leaflets pubescent beneath, the latter with glabrous leaflets, the flowers 1.5 cm. long; both these species ordinarily have fewer leaflets than *S. exasparata*. The low tree *S. grandiflora* Poir. (*Agati grandiflora* (L.) Desv.) with white, pink or bright red flowers, 6–7 cm. long, borne in axillary racemes, may be introduced.

Piura: Pariñas Valley, *Haught F165* (det. Killip).—Loreto: Iquitos, *Williams 7895*. Port of New York, Ucayali, (*Huber*). To Central America and the West Indies. "Frijalilla."

51. APURIMACIA Harms

Similar to *Coursetia* to which it could be referred, but branches slender, virgate; racemes many-flowered, the flowers mostly borne in pairs and, especially, the style glabrous unless at base.

Apurimacia Michelii (Rusby) Harms, Repert. Sp. Nov. 19: 10. 1923. *Gliricidia Michelii* Rusby, Mem. Torrey Club 6: 22. 1896.

Open or laxly growing lightly pubescent shrub, usually 1–2 meters high, the tips of the long striately angled branches and the opening leaves silky pilose with ashy or brownish trichomes; leaves 5–12 cm. long with 5–9 pairs of oblong-elliptic or somewhat lanceolate obtuse and mucronulate or acutish leaflets, glabrous above, minutely and sparsely appressed strigillose beneath or finally glabrate, mostly about 2 cm. long, 8–10 mm. broad; racemes usually 5 cm. long, densely many-flowered; pedicels 1–4 mm. long; calyx more or less silky strigose, typically oblong-campanulate, the tube 3 mm. long, the short deltoid acutish lobes less than half as long; banner suborbicular moderately appressed sericeous without as to type; pods minutely strigillose or glabrate, coriaceous, 5–7 cm. long, about 13 mm. wide, obscurely impressed between the suborbicular seeds. Flowers violet (Weberbauer); varying degrees of pale purple (Stork & Horton); dull bluish, the bases green according to my collection.

Harms, l.c. 11, proposed three closely related species which as he himself suggested might prove to be forms of one: *A. libertatis* Harms, characterized particularly by nearly glabrous banner; *A. incarum* Harms, slightly more acute leaflets and more lanceolate calyx teeth, little shorter than the tube; *A. lonchocarpoides* Harms, l.c. 12, the banner smooth or nearly, the calyx teeth short. The accumulating collections do not indicate that these forms can be maintained as species.

According to Weberbauer and Raimondi the roots are used as a narcotic in fishing. Also it is an insecticide for the cure of cattle infected with *Distoma hepaticum* and its ash is an ingredient of "llipta," employed in the chewing of coca (Herrera). F.M. Negs. 2070 (*A. incarum*); 2071 (*A. libertatis*); 2072 (*A. lonchocarpoides*).

Ancash: Valley of the Puccha, 2,700 meters, *Weberbauer 3740* (type, *A. lonchocarpoides*).—Libertad: Above Huaylillas, among rainy-green shrubs, 2,900 meters, *Weberbauer 7083* (type, *A. libertatis*). Tayabamba, *Raimondi*.—Ayacucho: Near Huanta, in shrubwood, *Weberbauer 7508*.—Lima: Yauyos, (*Raimondi*, det. Harms, *A. incarum*).—Huánuco: Near Huánuco, *Sawada P.79*.—Junín: Uspachaca, river canyon, *1293*. Huariaca, *2403*. San Rafael, *3137*.—Apurímac: Near Chalhuanca, 2,800 meters, *Weberbauer 7172* (type, *A. incarum*). Oropeza Valley, *Vargas 9772*. Pincos, 2,700 meters,

Stork & Horton 10694. Argama, trailing or scandent among shrubs, *West 3749* (det. Johnst.).—Cuzco: Calca, 2,960 meters, *Vargas 693.* Ollantaytambo, *Cook & Gilbert 800.* Urubamba Valley, *Cook & Gilbert 1775; Herrera 2078.* Yucay, *Soukup 732.* Paruro, (*Raimondi*, det. Harms, *A. incarum*). Bolivia. "Chacanhuai," "chacanuai" (Herrera), "chachahuay" (Raimondi), "chacanoa" (C. & G.).

52. COURSETIA DC.

Cracca Benth.; *Benthamantha* Alef.; *Poissonia* Baill.

Glabrate to softly pubescent perennials, shrubs or trees with abruptly or odd-pinnate leaves, these with many, rarely reduced to 1, entire petiolulate or sessile leaflets, the stipules subulate, sometimes somewhat spinescent. Racemes axillary, the pedicellate flowers solitary in the axils of small or setaceous caducous bracts. Calyx-teeth broad, subequal, the upper two often united higher. Petals subequal, the banner broad, sometimes with reflexed margins, the wings obovate-oblong, free; the keel often incurved, its petals coherent above. Stamens 10, the upper free or lightly connate with the other at the middle. Ovary sessile, many-ovulate, the style inflexed at base, bearded toward or at apex all around or on the inner side. Pod linear, compressed, 2-valved, usually more or less obviously constricted exteriorly between the seeds, often deeply, the pod thus partitioned or frequently septate. Seeds subquadrate to rectangular or orbicular.

Hauman, Kew Bull. 276–279. 1925, has taken up the genus of Baillon, but as pointed out by Bentham in Hook. Icon. Pl. ser. 3. 1: 52. 1870, and Harms, Repert. Sp. Nov. 19: 15. 1923, it is more properly considered a section with unifoliolate leaves, similar variation occurring in *Indigofera, Tephrosia, Desmodium, Swartzia, Dalbergia* and other genera. The style pubescence is variable in position and amount. Likewise *Cracca* Bentham (*Benthamantha* Alef.) is evidently a component of *Coursetia* because *C. orbicularis* (*Poissonia*) as well as other species have pods more or less impressed about the seeds, showing that this character, the single diagnostic one for *Cracca*, is variable.

Leaves pinnate.

Leaflets 3–5 (–7) pairs; pod glabrous.

Leaflets 1–3 cm. long; flowers about 1 cm. long. . *C. ochroleuca.*

Leaflets 5–9 mm. long; flowers about 1.5 cm. long.

C. Weberbaueri.

Leaflets 6–20 pairs; pods sometimes pubescent.
Pubescence abundant, at least on leaves beneath.
Leaflets 12–15 mm. long or longer, at least many of them.
Leaflets rounded at tip, mucronulate.....*C. grandiflora.*
Leaflets distinctly apiculate.....*C. Harmsii.*
Leaflets 5–7 mm. long or smaller.
Flowers 10 mm. long or longer.....*C. tephrodes.*
Flowers about 8 mm. long or shorter.....*C. fruticosa.*
Pubescence sparse even on leaves beneath.....*C. tumbezensis.*
Leaves unifoliolate.
Leaves suborbicular, the petioles short.....*C. orbicularis.*
Leaves cordate, the petioles 10 mm. long or longer....*C. eriantha.*

Coursetia eriantha Benth. in Hook. Icon. Pl. ser. 3. 1: 52. 1870. *Poissonia eriantha* (Benth.) Haum. Kew Bull. 279. 1925.

Shrub with unifoliolate leaves, the broadly ovate or orbicular leaflet broadly cordate at base, white tomentose, nearly lanate beneath, green and glabrous above, 3–4 cm. long, 2.5–3.5 cm. broad; petioles 10–14 mm. long; flowers few, violet, the banner white pubescent; calyx turbinate, the teeth subulate from a broad base, the sinuses broadly rounded; style bearded on the inner side, glabrous just below the stigma; pod (immature) 3 cm. long, smooth, with 7 seeds.—Description compiled from Bentham and Hauman. Pearce noted the plant as an evergreen shrub 2–3 meters high.

Cuzco: La Banca, Prov. Anta, 2,700 meters, (*Pearce*, type).

Coursetia fruticosa (Cav.) Macbr. Field Mus. Bot. 4: 88. 1925. *Lathyrus fruticosus* Cav. Icon. 1: 58. *pl. 84.* 1791. *Orobus tomentosus* Desf. Cat. Hort. Par. ed. 1: 195. 1804. *C. tomentosa* (Desf.) DC. Ann. Sci. Nat. sér. 1. 4: 92. 1825. *Cracca poliophylla* Harms, Repert. Sp. Nov. 18: 236. 1922. *C. perplexans* Macbr. l.c.

Shrub usually about 1 meter high, often with numerous short branches, the subherbaceous flowering branchlets, leaves and calyces densely ashy villous-tomentose, the trichomes somewhat spreading; leaves subsessile, 2–3 cm. long, with 6–20 pairs of oblong-oval blunt or minutely mucronulate leaflets, generally about 5 mm. long and half as broad, rarely glabrescent above; stipules linear, 4–7 mm. long; racemes axillary, few-flowered, 3–4 cm. long; pedicels short; calyx 3.5 mm. long, the tube somewhat exceeded by the lance-subulate teeth; flowers glabrous, greenish-yellow, about 8 mm. long,

the orbicular banner emarginate; style minutely bearded above; pod linear-oblong more or less compressed without between the 8–10 seeds, villous, about 4–5 cm. long, 5–6 mm. broad.—Scraggly shrub that makes masses of wood with mere sprigs of leaves and flowers (Stork & Horton). The species of Harms, i.e. *C. perplexans* Macbr., the only material seen with mature fruit, may be distinct as it shows considerable constriction of the pods between the seeds. *C. dubia* (HBK.) DC., common in Ecuador, if found in Peru may be distinguished by the leaves glabrous above, the glabrous pods constricted only exteriorly between the seeds. F.M. Neg. 2082.

Huánuco: Cultivated at Madrid from seeds from Huánuco, type; gravelly gulch, *3248; 2449; Sawada P.123; Kanehira 220;* dry, rocky mountain side, 1,930 meters, *Stork & Horton 9393.*—Apurímac: Near Amoray, among shrubs, *Weberbauer 7173* (type, *C. poliophylla*). Oropeza Valley, 2,500 meters, *Vargas 9766.*—Cuzco: Calca, 2,960 meters, *Vargas 698* (leaflets glabrate above).

Coursetia grandiflora Benth. ex Benth. & Oerst. Vid. Medd. Kjoeb. 1853: 10. 1854.

Densely leafy shrub, the leaves with about 12 pairs of oblong, obtuse but mucronulate leaflets mostly 1.5 cm. long, 5–6 mm. broad, loosely ashy villous beneath, glabrate in age above and evidently net-veined, subcoriaceous; racemes 8–10 cm. long; pedicels 2–6 mm. long or about twice as long as the calyx, this with tube and ovate subulate teeth subequal; banner to 18 mm. long, apparently often shorter, the keel arcuate, subrostrate; pod (immature) 4 cm. long, probably lightly pubescent, slightly constricted between the seeds.—Known to me only from leaf-scrap and photograph. *C. mollis*, if sought here, is mentioned under *C. tumbezensis*. F.M. Neg. 2074.

Amazonas: Chachapoyas, *Mathews 7164*, type.

Coursetia Harmsii Ulbr. Repert. Nov. Sp. 2: 12. 1906.

Upper branches, leaflets beneath and rachis of the long racemes densely villous with rather long trichomes; leaves 5–12 cm. long with 8–15 pairs of oblong lanceolate acutely acuminate leaflets 10–15 mm. long, 2–4 mm. broad, puberulent above in age and manifestly reticulate-veined; flowers 12–16 mm. long, the pedicels about 5 mm. long; calyx 5 mm. long, the ovate acute teeth much shorter than the strigillose-tomentose tube; banner suborbicular, the keel broadly rostrate; style densely bearded within; pod (immature) 5.5 cm.

long, 3 mm. broad, glabrous, not obviously constricted between the seeds.—Description of pod from my collection; the species seems to approach, as suggested by the author, *C. grandiflora*, but the pubescence is less tangled and apparently the mature pods will show further distinctions.

Ancash: Below Pampa Romas near Samanco, 2,100 meters, *Weberbauer 3192*, type. In shrubs, gravelly valley, flowers pink-white, Tambo de Pariocota, *2547*.

Coursetia ochroleuca (Jacq.) Macbr., comb. nov. *Galega ochroleuca* Jacq. Icon. Rar. 1: 15. *pl. 150*. 1786. *Cracca ochroleuca* (Jacq.) Benth. & Oerst. Vid. Medd. Kjoeb. 1853: 9. 1854. *Benthamantha ochroleuca* (Jacq.) Alef. Bonplandia 10: 264. *pl. 150*. 1862.

Lightly pubescent perennial more or less woody toward the base, the sparsely branched stem becoming a few dm. high; stipules subulate setaceous to 10 mm. long; leaves about 1 dm. long, with 5–7 usually oval blunt but mucronulate leaflets, 1–3 cm. long; racemes few-flowered, sometimes 1 dm. long; pedicels recurved in fruit, 3–4 mm. long, longer than the pilose calyx, the calyx-teeth as long as or longer than the tube; flowers 7–10 mm. long, yellowish, often tinged with red; pod glabrous, 3–5 cm. long, 3.5 mm. broad, distinctly impressed between the seeds.—The similar *C. caribaea* (Jacq.) Benth. has more numerous leaflets and appressed strigose pubescence. **C. glandulifera** (Benth.) Macbr., comb. nov. (*Tephrosia glandulifera* Benth. Pl. Hartw. 115. 1843), found as near as Ecuador, has smaller flowers, the pubescence in part glandular.

Lima: Chanchay and Cheuchín, *Dombey*. Chosica, in rocks or river gravel, *492; 525*. North to Central America.

Coursetia orbicularis Benth. in Hook. Icon. ser. 3. 1: 52. *pl. 1065*. February, 1870. *Poissonia orbicularis* (Benth.) Haum. Kew Bull. 278. 1925. *P. solanacea* Baill. Adansonia 9: 296. April, 1870.

Much branched shrub similar to *C. eriantha*, but the nearly orbicular leaves about 2 cm. long on petioles only 5–6 mm. long; flowers 1–3, the pedicels 4–8 mm. long; calyx 10 mm. long, tomentose, the teeth acuminate; petals roseate, glabrous; style bearded all around apically; pod glabrous, 2.5–7 cm. long, 6–8 mm. broad, 3–6-seeded.—The var. *mantaroana* Harms, Repert. Sp. Nov. 19: 15. 1923 (*P. orbicularis* var. *mantaroana* (Harms) Haum. l.c. 279) has the leaves tomentose on both sides, the flowers more numerous, the pods distinctly constricted between the seeds, pointing to the unity of the genus with *Benthamantha*. F.M. Neg. 2078 (the var.).

Huancavelica: 2,400 meters, (*Pearce*, type). Valley of the Río Mantaro on grass steppe, 1,400 meters, *Weberbauer 6513* (type, the var.). Without locality, *Gay 1647; 180.*

Coursetia tephrodes Harms, Repert. Sp. Nov. 19: 236. 1924.

Shrub with apparently the habit of *C. fruticosa* and similar in foliage and pubescence but the more numerous roseate flowers somewhat larger; peduncle to 2 dm. long, the pedicels 4–5 mm. long, about half as long as the densely strigose calyx, this with subequal teeth and tube, the former lance-acuminate; keel shortly rostrate-acute.—As suggested by the author, this approaches *C. Harmsii* and may prove to be a variety. F.M. Neg. 2076.

Cajamarca: Near Cajabamba, in rainy-green shrubs, 2,700 meters, *Weberbauer 7214*, type.

Coursetia tumbezensis Macbr. Field Mus. Bot. 8: 97. 1930.

Nearly glabrous apparently little-branched shrub attaining 4 meters; stipules 5 mm. long; leaves about 1.5 dm. long with 15–18 pairs of oblong-elliptic abruptly apiculate membranous glabrate leaflets, the larger nearly 2.5 cm. long, about 8 mm. broad; racemes long-peduncled, laxly flowered, 2 dm. long or longer, minutely appressed strigillose, the slender pedicels to 1 cm. long; calyx-teeth broadly ovate-acuminate, nearly 2 mm. long, shorter than the tube; flowers purple, nearly 15 mm. long, the arcuate keel acutish; style longitudinally bearded at tip; pod glabrous (immature).—A silky pilosity on the young parts is more or less promptly deciduous. In the absence of fruit, the generic identity is not certain, but the style and calyx are those of this genus. **C. mollis** (Benth. & Oerst.) Macbr., comb. nov. (*Cracca mollis* Benth. & Oerst. Vid. Medd. Kjoeb. 1853: 9. 1854), Ecuadorian, has softly pubescent branchlets and leaves.

Tumbez: Deciduous bushwood, east of Hacienda Chicama, 1,000 meters, *Weberbauer 7647*, type.

Coursetia Weberbaueri Harms, Bot. Jahrb. 42: 95. 1909.

Low stocky much-branched shrub, the younger branches and leaves and elongate racemes ashy silky-pubescent, glabrate in age; leaves odd-pinnate, 1–2.5 cm. long, with 3–5, usually 4, pairs of obovate or oblong, obtuse, sometimes retuse leaflets, 5–9 mm. long, 3–7 mm. broad; stipules lanceolate-acute to 4 mm. long; pedicels as the calyces glandular-pilose, the former 3–4 mm. long,

the latter twice as long, with tube 3.5 mm. long, the broadly lanceolate-acuminate teeth about 6 mm. long; banner 17 mm. long, the acute keel 11–12 mm. long; ovary glabrous.—Remarkable in its distinctive few leaflets and in this respect connecting *C. ochroleuca* and relatives with species more characteristic of *Coursetia*. F.M. Neg. 2077.

Arequipa: Loma formation, 200 meters, Tambo near Mollendo, *Weberbauer 1567*, type.

53. ASTRAGALUS L.

Herbs, often somewhat lignescent at base and densely branched, the Peruvian usually cespitose, more or less pubescent, rarely spinescent from the indurated petioles of the odd-pinnate leaves. Stipules free, or more or less adnate. Calyx tubular, the teeth subequal. Flowers usually long and narrow, the banner equaling or exceeding the wings and blunt keel. Stamens diadelphous. Ovary sessile or stiped, 2–many-ovuled. Pod 2–many-seeded, various in form and texture, one or both sutures usually projecting into the cell, the pod thus more or less imperfectly divided.

Flowers about 1 cm. long or longer.

Plants diffuse, the slender stems elongating 1–several dm.; bracts inconspicuous or flowers pedicellate and more or less loosely racemose.

Leaflets ashy-sericeous both sides; pods without false septum, not sharply reflexed.....*A. Richii.*

Leaflets soon green or not cinereous, glabrate or glabrous above; pods with false (at least rudimentary) septum.

Leaflets glabrate or sparsely strigose beneath; pods glabrate or glabrous, reflexed.

Flowers at most 1 cm. long; ovary glabrous.....*A. cracca.*

Flowers 12–15 mm. long; ovary strigose...*A. Weberbaueri.*

Leaflets pilose beneath; pods pubescent, not reflexed. *A. romasanus.*

Plants with stout often tufted erect stems, or if diffuse, depressed-cespitose.

Flowers racemose or capitate on more or less developed peduncles or if these obsolete and flowers solitary (alpine states) foliage somewhat cinereous.

Stems tufted, a dm. high or higher; peduncles stiff, well developed.

Leaflets soon deciduous, the rachis persisting and spine-like.....*A. Dombeyi.*

Leaflets tardily deciduous, the rachis rarely persisting. *A. Garbancillo.*

Stems depressed, shorter; peduncles more or less recurved or obsolete.....*A. Pickeringii.*

Flowers solitary or few, axillary; plants depressed.

Leaves green.....*A. uniflorus.*

Leaves shaggy, white-villous.....*A. Dillinghami.*

Flowers rarely 8 mm. long.

Perennials, depressed or tufted.

Flowers more or less peduncled, solitary or usually 2 or more in racemes or heads.

Plants somewhat cinereous with more or less spreading pubescence.

Pods lunate; leaflets about 5 mm. wide or wider. *A. arequipensis.*

Pods ovoid; leaflets 2–4 mm. wide.....*A. Brackenridgei.*

Plants green, glabrate or the pubescence appressed-strigose, sparse.

Leaflets mostly obtuse or acutish.

Flowers 6–8 mm. long.

Leaflets 9–12 pairs; calyx pubescent..*A. Cuatrecasasii.*

Leaflets 3–6 pairs; calyx nearly glabrous..*A. punensis.*

Flowers 3–4 mm. long; leaflets 6–8 pairs.*A. micranthellus.*

Leaflets emarginate.

Leaflets small, 4–8 pairs.....*A. Pilgeri.*

Leaflets several mm. long, 8–12 pairs....*A. cryptanthus.*

Flowers solitary or geminate in the axils, sessile or subsessile.

Leaflets minute, about 1 mm. long, sometimes to 2 mm. long but then green.

Plants more or less strigillose but greenish.

Leaflets 3–9 pairs, minute.

Leaflets 5–9 pairs.

Leaflets rather remote, oblong; calyx-teeth much shorter than the tube.

Leaflets somewhat pubescent.....*A. minimus.*

Leaflets glabrous.....*A. punensis.*
Leaflets crowded, oval; calyx-teeth and tube subequal.....*A. alpamarcae.*
Leaflets 3–4 pairs, minute.....*A. minutissimus.*
Leaflets 10–14 pairs, to 3 mm. long....*A. casapaltensis.*
Plants silvery-strigose.....*A. Dielsii.*
Leaflets usually larger, always cinereous with loose pubescence.
Flowers 5–7 mm. long; calyx-teeth much shorter than the tube.
Stipules pilose or glabrate, subenclosing the flowers. *A. pusillus.*
Stipules imbricate, glabrous, the flowers terminal. *A. peruvianus.*
Flowers 8 mm. long or longer; calyx-tube and teeth subequal.....*A. Dillinghami.*
Annual.....*A. triflorus.*

Astragalus alpamarcae Gray, U. S. Expl. Exped. Bot. 1: 417. 1854.

Depressed, densely tufted, the woody caudex much branched, the plants only a cm. or two high; stipules vaginate; leaves many, 5–10 mm. long with 5–10 pairs of oval or obcordate emarginate early silvery-villous, soon glabrous minute leaflets; flowers scarcely 5 mm. long, solitary or binate, sessile or nearly, terminal; calyx campanulate, 3 mm. long, sparsely pubescent, the slightly shorter teeth triangular, subulate; banner broadly obovate; ovary 2-celled, biovuled, silky-villous.—Flowers light purple, the banner with a central white spot.

Lima: Casapalca, loose soils of alpine basin slopes, 5,000 meters, *837* (det. Johnst.). Near Alpamarca, *Wilkes Exped.*, type.

Astragalus arequipensis Vog. Nov. Act. Acad. Leop.-Carol. 19: Suppl. 1: 17. 1843.

Plants forming close tufts about 1 dm. high, the leaves much longer than the short stems and axillary shortly peduncled spikes; leaflets 7–14 pairs, oblong-elliptic, emarginate, usually 8–10 mm. long, about half as broad, typically glabrous or glabrate above, laxly pilose beneath as also the rachis; stipules free from the petiole but connate; peduncles a cm. or so long, the flowers bluish, 6 or 7 mm.

long, subcapitate; calyx narrowly campanulate, black and white pilose, scarcely 4 mm. long, the narrow acute teeth shorter than or about as long as the tube; pods sessile, triquetrous, somewhat falcate, coriaceous, sparsely strigillose, about 1 cm. long, 6 mm. thick.—According to Pennell the plant is poisonous to stock. *A. Orbignyanus* Wedd., Chlor. And. 2: 260. 1857, of Bolivia, is scarcely distinct, the leaflets long-pilose even above as in *Werdermann 1119*. F.M. Neg. 145.

Cuzco: Pfinay-pampa, 4,000 meters, among grasses, *Vargas 9754*.—Arequipa: Near Arequipa, *Meyen 62*, type. Between Arequipa and Puno, *Hammarlund 73*.—Puno: Chuquibambilla, 3,900 meters, rocky-clay soil, *Pennell 13351*. Putina, *Soukup 966; 1239*. Orurillo, *Soukup 847*. Grass steppes near Titicaca, (Weberbauer, 185).—Tacna: Ancara, 4,300 meters, *Werdermann 1119* (det. Johnst.). To Argentina.

Astragalus Brackenridgei Gray, U. S. Explor. Exped. Bot. 1: 416. 1854. *A. salubris* Macbr. Field Mus. Bot. 11: 25. 1931.

With the habit of *A. arequipensis* and similar except that the stipules are vaginate about the slender petioles, the leaflets oblong and narrower and, especially, the pods ovoid, 6–8 mm. long, half as thick.—The racemes are often very short, dense and black-pilose. Named for Mr. Brackenridge, who aided in the plant collection on the Wilkes Expedition. Johnston is correct in regarding the specimen segregated by me as a smaller form.

Lima: Above Baños, *Wilkes Exped.*, type.—Junín: Cerro de Pasco, *Sawada P.86* (type, *A. salubris*). Shelby, grassy stony plains, *1089*. Morococha, short grass slopes, 4,500 meters, *889; 1531; Martinet*. Near Junín, (*Hitchcock 22189*, det. Johnst.). Tuapata, 3,750 meters, (*Watkins*, det. Johnst.).

Astragalus casapaltensis Ball, Journ. Linn. Soc. Bot. 22: 36. 1885.

With the habit of *A. alpamarcae* but often larger usually more numerous leaflets sparsely long-strigose, soon glabrate, 4 mm. long, half as broad, the calyx-teeth not much shorter than the tube, the flowers about 6 mm. long; ovary 4–6-ovuled; pods oblong, triquetrous, 5–7 mm. long, about 4 mm. thick, obscurely and sparsely puberulent, finally glabrous.—Flowers bright lilac-red or lavender, the banner with central white spot. Determinations by Johnston.

Lima: Casapalca, 4,200 meters, (*Ball*, type). Río Blanco, *817; 3020*.—Junín: Huarón, rocky slope, 4,500 meters, *1114*. Cerro de

Pasco, *2401; 3067; 3076.* Near Huancayo, *Killip & Smith 22123.* Casa Cancha, *Wilkes Exped.*

Astragalus cracca DC. Astrag. 101. *pl. 9.* 1802. *A. ocrosianus* Ulbr. Bot. Jahrb. 37: 419. 1906.

Resembling *A. Richii* but the pale green leaves are less pubescent, the plant thus not cinereous and, especially, the ovary is glabrous and the pods firm, somewhat 3-angled and oblong to about 15 mm. long, half as broad, partly 2-celled by intrusion of lower suture to 1 mm. high.—Johnston, Journ. Arnold Arb. 19: 91. 1938, has with his usual lucidity pointed out these distinctions. The pods however are not always closely reflexed as he states; the curved pedicels at maturity may be horizontally spreading or even ascending. F.M. Neg. 147 (*A. ocrosianus*).

Ancash: Ocros, 3,300 meters, *Weberbauer 2666* (type, *A. ocrosianus*); 170.—Lima: Canta, open grassy knolls, 3,000 meters, *Pennell 14607* (det. Johnst.); open rocky slope, 2,700 meters, *Pennell 14345.* Matucana, in loose soils, *293.* Without locality, *Dombey*, type.

Astragalus cryptanthus Wedd. Chlor. And. 2: 259. 1857.

Low, cespitose, with the habit of *A. arequipensis* but glabrous or glabrate, the leaves yellowish-green or bright green with 8–12 pairs of obovate emarginate leaflets; stipules vaginate at base, shortly bifid; flowers 3–5, about 6 mm. long on axillary peduncles only about 1 cm. long; calyx 4–5 mm. long, appressed black pubescent, the subulate teeth much shorter than the campanulate tube; pods to 12 mm. long, barely 5 mm. broad, falcate, deeply sulcate, minutely or scarcely puberulent, glabrate in age.—Stems a dm. high or higher, the larger leaflets 7 mm. long, 5 mm. broad.

Tacna: Chislluma, 4,500 meters, *Werdermann 1159.* Bolivia.

Astragalus Cuatrecasasii Macbr. Candollea 7: 221. 1937.

Laxly cespitose as *A. micranthellus*, the diffuse stems 5–10 cm. long; leaves green, sparsely hispidulous, finally nearly glabrous, 1.5–2 cm. long with 9–12 pairs of oblong, obtuse or acutish leaflets, scarcely 2 mm. long, less than 1 mm. broad; stipules 3 mm. long, connate only at base; flowers 7 mm. long, solitary or 2 or 3 on short axillary peduncles much shorter than the subtending leaf; calyx in type densely short-black-pubescent, 4 mm. long, the linear subulate teeth half as long; banner broadly obovate; ovary 1-celled with 2 ovules.—*A. modestus* Wedd. Chlor. And. 2: 262. 1857, of Bolivia, is,

ex char., rather similar but the leaflets are 6 pairs or fewer, 3–4 mm. long, the stipules coalescent to the middle, the calyx-teeth and tube subequal. Named for my friend, J. Cuatrecasas. F.M. Neg. 30016.

Peru (?): Without locality, *Ruiz & Pavón*, type.

Astragalus Dielsii Macbr. Field Mus. Bot. 11: 24. 1931.

Similar to *A. alpamarcae* but at least in flower silvery-pubescent with rather long subappressed trichomes; leaflets 5–7 pairs, obovate, retuse, minute; flower solitary, subsessile, 8 mm. long, pale blue; calyx-teeth narrowly triangular, about 1.5 mm. long, the closely appressed-sericeous tube nearly twice as long; banner subrotund; pods broadly ovoid, glabrous or nearly, 1-celled but the lower suture inflexed, 1-seeded, 3 mm. long, 2 mm. thick.—Named for my friend, L. Diels.

Ancash: Yanashallos, loose stony slopes, *2479*, type.—Junín: La Oroya, *Weberbauer 1704* (det. Johnst.).

Astragalus Dillinghami Macbr. Field Mus. Bot. 8: 98. 1930.

Depressed, compact, the stoutly branched caudex or ligneous stems a cm. or two high, clothed with the densely silvery-villous leaves in which the pale lilac flowers are partially concealed; stipules imbricate, membranous, villous; leaves 1.5–2 cm. long, the abundant trichomes to 2.5 mm. long; leaflets 4–6 pairs, ovate-lanceolate, acute, mostly about 4 mm. long, 2 mm. broad; flowers crowded or few in the axils, about 1 cm. long; bracts linear-lanceolate, 5 mm. long, appressed-villous; calyx inordinately villous, 7 mm. long, the linear-setaceous teeth little shorter than the tube.—Named for Mr. Dillingham of Morococha of the Cerro de Pasco Copper Corporation. *A. Urbanianus* Ulbr. Bot. Jahrb. 37: 422. 1906, of Bolivia, is somewhat similar but is much less villous and the stout stems are conspicuously clothed with the membranous yellow imbricated stipules.

Junín: Near Morococha, stony short-grass slopes, 4,500 meters, *1052*, type.

Astragalus Dombeyi F. B. Fischer, Bull. Soc. Nat. Mosc. 26: 483. 1853. *A. alienus* Gray, U. S. Expl. Exped. Bot. 1: 418. 1854. *A. imputatus* Macbr. Candollea 5: 370. 1934, fide Johnston.

Low shrub, the rigid spreading branches densely clothed with the old stiff leaf-rachi, these long persisting and more or less spinescent, 3–4 cm. long; stipules vaginate; leaflets typically crowded,

(8) 12–15 pairs, elliptical, retuse or apparently more usually subacute, 2.5–5 mm. long, ashy-pubescent above; flowers geminate in the upper axils, about 12 mm. long; calyx dark-pubescent, the narrowly ovate teeth shorter than the tube; ovary silky-villous, 1-celled, 5-ovuled.—According to the original description of *A. alienus* the leaflets are retuse and crowded which as Johnston has indicated are no doubt variable characters. Obviously the plant is related to *A. Garbancillo*, which not infrequently retains some of the leaf-rachi as pseudo-spines, and of which it may indeed be only an extreme form.

Lima: Above Baños, *Wilkes Exped.* (type, *A. alienus*). Río Blanco, 3,000 meters, open hillsides, *Killip & Smith 21739* (type, *A. imputatus*). Above San Mateo, *Raimondi.*—Junín: Huasahuasi, *Dombey*, type.

Astragalus Garbancillo Cav. Icon. 1: 59. *pl. 85.* 1791. *A. unifultus* L'Hér. Stirp. Nov. 168. 1791. *A. Garbancillo* var. *Mandoni* (Rusby) Macbr. Field Mus. Bot. 8: 100. 1930. *A. Mandoni* Rusby, Mem. Torrey Club 3, no. 3: 19. 1893.

Tufted perennial or half shrub, the often numerous glabrate or more or less pilose stout stems erect or sometimes decumbent-ascending, ordinarily 1 to several dm. high, or in alpine states reduced and much lower, the stems even creeping; stipules usually conspicuous, often white-membranous, vaginate at base; leaflets 10–15 pairs, oblong or elliptic, obtuse or emarginate, usually 4–10 mm. long, about half as broad, green and glabrate to ashy-pilose; peduncles axillary, about equaling the leaf, the flowers often many, 10 mm. long or longer, yellowish to purple; calyx usually black-pilose, 8 mm. long or longer, the subulate teeth at least half as long; pods ovoid-oblong, somewhat compressed, puberulent, 3–4-seeded.—*A. unifultus*, apparently the same, was published in December; it may represent the white-flowered form with more ovoid pods, highly variable especially in habit and pubescence. Johnston, Journ. Arnold Arb. 93. 1938, refers to *A. Pickeringii* the var. *varus* Macbr., an alpine form much reduced, the peduncles strongly recurving, the pods smaller; it is evidently a connecting form.

As recorded by Ruiz & Pavón this common species is fatal to stock, in this respect resembling the related so-called "loco-weeds" of western America; according to Herrera the plant is employed in medicine and as an aid to soap in the washing of fine clothes, and further it is said to have insecticidal properties! F.M. Negs. 29404; 27944; 27937.

Ancash: Pomopampa, 4,500 meters, dry stony slopes, *2499* (type, var. *varus*).—Lima: Canta, 3,300 meters, open rocky slopes, *Pennell 14620*. Río Blanco, *Killip & Smith 21719*. La Oroya, erect clumps, flowers purple or yellowish, *945*. Chinche, grassy slope, 3,000 meters, flowers white or yellowish, *1279*. Mantaro Canyon, open rocky hillside, flowers yellowish, pinkish tinged, *Killip & Smith 22156*. Near Tarma, *Ruiz & Pavón*.—Huánuco: Near Huánuco, dry gulches, flowers purple-lilac, the banner white spotted, *2325*.—Huancavelica: Near Huancavelica, 3,700 meters, flowers white, *Goodspeed 10829*.—Apurímac: Pincos, 2,700 meters, flowers white, *Goodspeed 10696*.—Cuzco: Saxaihuamán, flowers white, *Pennell 13562*. Oropesa, *Pennell 14199*. Sicuani, (*Hicken*).—Puno: Near Puno, *Soukup 85*. Araranca, open gravelly slopes, 4,100 meters, *Pennell 14130*. To Argentina. "Garbancillo," "sogonche," "porotillo," "joscka," or "juscka" (Herrera), "salcca."

Astragalus micranthellus Wedd. Chlor. And. 2: 262. 1857. *A. capitellus* Britton, Bull. Torrey Club 16: 260. 1889, fide Johnston in herb. *A. patancanus* Ulbr. Bot. Jahrb. 37: 417. 1906, fide Johnston in herb.

Somewhat ashy-pilose cespitose plants, the diffuse stems becoming several cm. long; stipules vaginate above the middle; leaflets 4–8 pairs, oblong-lanceolate, obtuse or acutish, 2–6 (8) mm. long; peduncles axillary, 5–15 mm. long, the flowers 1–2 or few, 3–4 mm. long, whitish; calyx campanulate, about 2 mm. long, the teeth subulate; banner broadly obovate or obcordate; pods 7–10 mm. long, nearly oblong, subcompressed, finally glabrous or sparsely puberulent with 4–7 seeds. F.M. Negs. 27939; 2114 (*A. patancanus*).

Puno: Near Puno, *Weddell 4503*, type. To Argentina.

Astragalus minimus Vog. Nov. Act. Acad. Leop.-Carol. 19: Suppl. 1: 18. 1843.

Cespitose, closely tufted, the short lignescent stems obsolete or 1–2 cm. long; leaves 1, sometimes 2 cm. long, more or less ashy-strigillose or glabrate above with 5–6 pairs of somewhat fleshy oblong obtuse leaflets, 1–2 mm. long, less than half as broad; stipules more or less connate, scarious; flowers solitary or geminate, very shortly peduncled or subsessile, 5 mm. long; calyx ashy-pubescent, the subulate teeth much shorter than the narrow tube; banner broadly obovate; pods minutely and sparsely puberulent, about 6 mm. long, 3 mm. thick.—F.M. Neg. 144.

Puno: Above Toledo, *Meyen 67*, type.—Tacna: Ancara, 4,300 meters, *Werdermann 1136* (det. Johnst.).—Junín: Between Tarma and La Oroya, 4,300 meters, Weberbauer, 223. Bolivia.

Astragalus minutissimus Wedd. Chlor. And. 2: 257. 1857.

Densely cespitose, the slender branches only 1–1.5 cm. long, entirely covered with the marcescent stipules, the leaves and flowers apical; leaves 4–5 mm. long, sparsely pilose with 3–4 pairs of elliptic-ovate subemarginate rather fleshy leaflets, usually 0.5 mm. long; stipules ample, vaginate, ciliate; flowers 5 mm. long, subsolitary, axillary, sessile, exceeding the leaf; calyx membranous, scarcely half as long as the whitish corolla, the triangular obtusish teeth ciliate; banner obovate.

Cuzco: Mountains of Cuzco, (*Gay*, type).—Puno: Near Moho, *Shepard 110* (det. Johnst.). Bolivia.

Astragalus peruvianus Vog. Nov. Act. Acad. Leop.-Carol. 19: Suppl. 1: 18. 1843.

Resembles *A. pusillus* but the caudex often much branched, the branchlets densely clothed with the vaginate scarious merely ciliate stipules; flowers subsessile, often geminate, terminal, much exceeded by the crowded leaves, these about 2 cm. long with 6 or fewer pairs of elliptic-oval subappressed strigose-villous leaflets, mostly 2 mm. long, half as broad; calyx-teeth shorter than the rather lightly sericeous tube, the flowers 6–8 mm. long; banner obovate, somewhat puberulent without.—Simulates reduced forms of *A. Pickeringii* but distinguishable by the closely imbricated stipules. *A. geminiflorus* HBK. of Ecuador has likewise soon more elongate nodes and more numerous leaflets. F.M. Neg. 142.

Arequipa: Near Pisacoma, 5,000 meters, *Meyen 64*, type.—Moquehua: Carumas, 4,000 meters, *Weberbauer 7327*.

Astragalus Pickeringii Gray, U. S. Expl. Exped. Bot. 1: 415. 1854. *A. Pickeringii* Gray, var. *serpens* Ball, Journ. Linn. Soc. Bot. 22: 36. 1885, fide Johnston.

Caudices or short stems cespitose, 2 to several cm. long, the vaginate stipules closely imbricated on the leafy portions; leaflets 9–11 pairs, obovate-oblong, emarginate, usually 4–6 mm. long, approximately but not closely crowded; flowers ordinarily 3 or 4, subsessile or the peduncles shorter than the petiole, this exserted from the stipule, at most 6 or 8 mm.; flowers to 12 mm. long, the

membranous bracts 3 mm. long; calyx about 6 mm. long, the triangular subulate teeth much shorter than the cylindrical tube; ovary tomentose, short-stiped, about 5-ovuled.—The species in habit suggests *A. geminiflorus* HBK. of Ecuador with more crowded leaflets, smaller flowers, but as suggested by Weddell, Chlor. And. 2: 259. 1857, the affinity is rather with *A. Garbancillo* and Johnston, Journ. Arnold Arb. 19: 93–94. 1938, has shown that the plant of Gray is an alpine state which however has become reasonably well stabilized.

Lima: Casapalca, 4,200 meters, (*Ball;* type, var. *serpens*). Between Casa Cancha and Culnai, *Wilkes Exped.*, type. Ticlio, *Ledig 32* (det. Johnst.).—Huánuco: Chavanillo, upland grassland, 2,400 meters, *2308* (det. Johnst.). Chasqui, grassy subalpine slopes, *3295* (det. Johnst.).—Junín: Cerro de Pasco, 4,200 meters, *3068* (*Mathews 592*, det. Gray). Shelby, 4,000 meters, grassy stony plains, *1090*. Near Junín, *Mackenzie*. Between Tarma and Jauja, *Killip & Smith 23370* (det. Johnst.). Near La Oroya, *Kalenborn 133* (det. Johnst.).

Astragalus Pilgeri Macbr. Field Mus. Bot. 11: 25. 1931.

Cespitose, nearly glabrous, the spreading stems 1–4 cm. long, the green leaves very minutely and sparsely hispidulous, about 1.5 cm. long; leaflets 4–8 pairs, obovate, retuse, conduplicate, 2–3 mm. long; stipules small, connate only at base; flowers 7 mm. long, few at the tip of an axillary peduncle, subequaling or shorter than the leaf; calyx sparsely black-pubescent, 2–2.5 mm. long, the triangular subulate teeth distinctly shorter than the campanulate tube; banner subrotund, nearly 5 mm. broad; ovary about 5-ovuled.—Named for my friend, R. Pilger.

Cuzco: Hacienda Chuchapaya, Valle del Paucartambo, 3,800 meters, *Herrera 2315*, type. Bolivia.

Astragalus punensis Macbr., spec. nov.

Ut *A. micranthellus;* foliis 3–6-jugis, 1–1.5 cm. longis, glabris; foliolis ad 3 mm. longis, vix 0.5 mm. latis; floribus solitariis, 7 mm. longis; pedunculis axillaribus circa 5 mm. longis; calycis dentibus anguste triangularibus circa 1 mm. longis, obscure ciliolatis tubo glabro oblongo-campanulato fere duplo brevioribus; vexillo anguste obovato; leguminibus glabris circa 1 cm. longis.—With *A. Cuatrecasasii* and *A. modestus* Wedd. suggesting *A. micranthellus* Wedd., the last with uniformly much smaller flowers. Johnston referred

Soukup 424 to the Bolivian species of Weddell described as having linear calyx teeth nearly as long as the tube, flowers shortly racemose or umbellulate, but I have not seen the type.

Puno: Macusani, Salcedo, Calacoto, *Soukup 549; 424.*

Astragalus pusillus Vog. Nov. Act. Acad. Leop.-Carol. 19: Suppl. 1: 19. 1843.

Densely tufted cespitose acaulescent or the caudex somewhat branched, the congested leaves about 2 cm. long, densely ashy-strigose-villous; leaflets 4–8 pairs, obovate, to 4 mm. long, about half as broad; flowers crowded at the base of the leaves, about 6 mm. long; calyx teeth much shorter than the very pilose tube; banner cuneate-obovate.—Stipules broad, vaginate in type, conspicuously pilose, in most specimens glabrate. Banner light violet with white middle stripe (Weberbauer). F.M. Neg. 143.

Puno: Toledo, 5,000 meters, *Meyen 65*, type.—Tacna: Ancara, 4,300 meters, *Werdermann 1128* (det. Johnst.).—Arequipa: Above Chivay, 4,300 meters, *Weberbauer 6896;* 185. To Argentina.

Astragalus Richii Gray, U. S. Expl. Exped. Bot. 1: 418. 1854. *A. macrorrhynchus* Ulbr. Bot. Jahrb. 37: 420. 1906.

Stems prostrate ascending, slender, moderately branching, becoming several dm. long, ashy-subappressed-strigose as the leaves, or both glabrate and pale green in age; leaflets 7–12 pairs, oblong-lanceolate, 7–15 mm. long, 2–4 mm. broad, finally glabrate above; stipules 4–5 mm. long; peduncles slender, 5–8 cm. long, the rather loose racemes 1–4 cm. long, subappressed strigose with partly black trichomes; flowers nearly 10 mm. long, the campanulate calyx 4–5 mm. long, the subulate teeth to nearly as long; bracts 1.5–2 mm. long; banner oblong-obovate, emarginate; pods sessile, inflated, ovoid, tipped by the beak-like style, about 10 mm. long, 5–8 mm. thick without false septum, sparsely strigillose, finally pendent from the spreading or slightly recurved pedicels.—Gray named a genus and a number of species for William Rich, the botanist of the Wilkes Expedition. In Field Mus. Bot. 8: 99. 1930, I pointed out the identity of the plant of Ulbrich with that of Gray, an observation concurred in by Johnston, Journ. Arnold Arb. 19: 92. 1938. F.M. Neg. 2109 (*A. macrorrhynchus*).

Lima: Obrajillo, *Wilkes Exped.* (type, *A. Richii*). Matucana, rocky places and canyon edges, *214; 351.* Viso, *Weberbauer 112* (type, *A. macrorrhynchus*); 166.—Arequipa: Near Arequipa, gravel

ridge along arroyo, 2,100 meters, *Pennell 13241; (Douglas); Hopp 25.*—Tacna: Candarave, near Lake Huanahuata, in open society of herbs, shrubs and cacti, *Weberbauer 7365.*

Astragalus romasanus Ulbr. Bot. Jahrb. 37: 421. 1906.

Stems procumbent, branched at base where more or less ligneous, becoming a dm. or two long; stipules membranous, vaginate, persisting; leaflets 10–15 pairs, with the rachis loosely ashy-pilose, soon glabrous above, oval or oblong, emarginate or obtuse, 4–8 mm. long, 2–3 mm. broad; peduncles 4–7 cm. long with 4–12 distinctly pedicellate flowers, these about 15 mm. long; bracts 4 mm. long; calyx about 8 mm. long, the narrowly ovate teeth about as long; ovary shortly stiped; pods 10–15 mm. long, 4 mm. broad, imperfectly biseptate, lightly pilose.—Johnston, Journ. Arnold Arb. 19: 95. 1938, suggests the relationship is with *A. Pickeringii* and *A. Garbancillo;* it seems to me to be more nearly allied to *A. Weberbaueri.*

Ancash: Near Pampa Romas, 3,400–3,500 meters, *Weberbauer 3209,* type.

Astragalus triflorus (DC.) Gray, Pl. Wright. 2: 45. 1853. *Phaca triflorus* DC. Astrag. 62. *pl. 1.* 1802. *A. viciiformis* Ulbr. Engl. Bot. Jahrb. 37: 550. 1906, fide Johnston.

Rather delicate annual, pale green or more or less cinereous with short somewhat spreading trichomes, the sparsely branching stems sometimes about 1 dm. high; leaves 3–4 cm. long with 4–6 pairs of elliptic obtuse or retuse leaflets to 8 mm. long, half as broad, glabrous above; racemes about half as long as the subtending leaf, loosely few-flowered, the purplish flowers scarcely 5 mm. long; calyx strigillose, the narrow teeth subequaling the tube; pods oblong to 12 mm. long, nearly half as thick, puberulent, the pedicels short or recurving. —F.M. Neg. 2128.

Arequipa: Mollendo, loma formation, *Weberbauer 1504* (type, *A. viciiformis*); 144; *Johnston 3569.* Near Atiquipa, *Worth & Morrison 15630.*—Moquehua: Torata, 2,200 meters, *Weberbauer 7418* (det. Johnst.). Chile.

Astragalus uniflorus DC. Astrag. 243. *pl. 50.* 1802. *A. Herzogii* Ulbr. Meded. Rijks Herb. Leiden 27: 53. 1915, fide Johnston in herb.

Depressed, the caudex or short glabrous stems loosely branched, 1–3 cm. long; leaflets 3–12 pairs, oblong, obtuse, 2–4 mm. long,

glabrous or with a few scattered trichomes; stipules vaginate; flowers usually solitary, axillary, somewhat peduncled or terminal, reddish-purple, to 18 mm. long; calyx cylindrical, 8–10 mm. long, glabrate or lightly pilose, the narrow teeth much shorter than the tube; pods ovoid, glabrous, about 5 mm. long with no false septum (Johnston).—Ulbrich's species was separated on the basis of its smaller leaflets, slenderer stems and smaller flowers but from the material examined these apparent differences are probably ecological. Common in the Puna zone, Weberbauer 93, 201, 209, this last page with illustration. F.M. Negs. 6954; 2104 (*A. Herzogii*).

Junín: Huasahuasi, *Dombey*, type. Cerro de Pasco, grassy limestone slope, *3066*. Above Yauli, Weberbauer, 222.—Apurímac: Summit of Soccllaccasai Pass, open puna, 4,000 meters, *West 3829*.—Cuzco: Marcapata, 4,400 meters, *Vargas 1364; 9720*. La Raya, moist gravelly slopes, 4,300 meters, *Pennell 13526*. Bolivia. "Puna-surpo."

Astragalus Weberbaueri Ulbr. Bot. Jahrb. 37: 419. 1906.

Sprawling ascending, the long ligneous glabrous stems sparsely branched only toward the tips; stipules several to about 10 mm. long, more or less connate; leaflets glabrous or occasionally with scattered trichomes, 7–10 pairs, narrowly oblong, 8–13 mm. long, 1.5–3 mm. broad, emarginate or subtruncate; peduncles 5–9 cm. long with 5–15 crowded flowers, these 12–15 mm. long, the membranous persisting bracts 4–5 mm. long; calyx to 6 mm. long, the subulate teeth about as long as the sparsely pale or dark pubescent tube; ovary minutely stiped, strigose; pods oblong-triquetrous, 10–14 mm. long, weakly partly septate within, at maturity essentially glabrous, spreading or reflexed.—F.M. Neg. 146.

Piura: West of Huancabamba, 2,700 meters, *Weberbauer 6035; 6050*.—Cajamarca: Below San Pablo, 2,200 meters, *Weberbauer 3869*, type; 257. Near Nancho, *Raimondi 8294*. Near Hualgayoc, in open shrubby growth, 3,000 meters, *Goodspeed 10017*.—Libertad: South of Arenillos, 3,800 meters, *West 8163* (det. Johnst. as affine). Ecuador.

54. ADESMIA DC.

Patagonium Schrank.

Herbs or half shrubs sometimes with spinescent petioles. Leaves abruptly or odd-pinnate, the leaflets usually many, entire or dentate. Flowers yellow usually streaked with red, borne on solitary pedicels

in terminal racemes, the bracts small, bractlets none. Calyx lobes subequal or the lower a little longer. Banner orbicular, the wings obliquely oblong, the keel obtuse, acute or beaked. Stamens free, rarely 2, filaments adnate at base to the banner. Ovary sessile, 2–many-ovuled, the filiform style with small terminal stigma. Pod indehiscent or 2-valved, the upper suture usually straight, the lower deeply sinuate, the pod segments often plumose, plane or convex. Seeds orbicular or subglobose.—The name *Adesmia* is conserved.

Besides the following, *A. argentea* Meyen was reported from Peru by Weddell on the basis of the type collection by Meyen which however was obtained in northern Chile. There are also two shrubs with appressed and glandular setulose stems not at all spinescent, *Weberbauer 5900* and *5910*, Department of Apurímac, which were listed as probably of this genus; if so they may be a form of *A. miraflorensis* or represent a new closely related species, but they have not been available for further study.

In Weberbauer (opp. p. 132), there is a photograph of the tola formation in which Arequipa species are found.

Annuals or perennial, herbaceous or subherbaceous. . . *A. muricata.*
Shrubs often more or less spinescent.
  Entire plant, except flowers, glutinous. . . . . *A. verrucosa.*
  Plants sometimes glandular but not glutinous.
    Leaves subsessile, the leaflets minute. . . . . *A. spinosissima.*
    Leaves well-petioled, the leaflets 3–4 mm. long.
      Leaflets 3–4 pairs, sericeous. . . . . *A. Augusti.*
      Leaflets 6–10 pairs, puberulent.
        Banner of flowers pilose. . . . . *A. vicina.*
        Banner of flowers glabrous. . . . . *A. miraflorensis.*

Adesmia Augusti Macbr. Field Mus. Bot. 8: 100. 1930.

Stocky decumbent much-branched spinescent shrub, the short flowering branches appressed ashy-pubescent, the spines glabrous, dull; petioles 5–10 mm. long, the leaves with 3–4 approximate pairs of broadly obovate acutish densely sericeous pubescent leaflets nearly 4 mm. long, 3 mm. broad; pedicels 4–7 mm. long; calyces densely ashy pilose, 4 mm. long, the narrow ovate lanceolate teeth about 1.5 mm. long; flowers yellow, 8 mm. long, the banner lightly appressed pilose, the wings sparsely so, long and slenderly clawed; pod (immature) plumose pilose.—Resembles several closely related

species of northern Chile, to one of which it may have to be referred (cf. remarks accompanying original description) but probably nearest *A. argentea* Meyen (*A. cinerea* Clos) of Atacama with much smaller and distant leaflets.

Tacna: Candarave, in formation of scattering shrubs or Cereus and herbs, 2,900 meters, *August Weberbauer 7389*, type.

Adesmia miraflorensis Remy, Ann. Sci. Nat. sér. 3. 6: 357. 1846.

Much branched thorny shrub, sometimes 2 meters high; younger branchlets and leaf-rachi rather lightly appressed pilose; leaves 1–1.5 cm. long with 7–10 pairs of entire, emarginate or minutely mucronulate oblong oval glabrescent leaflets about 2 mm. long, half as broad; stipules scarious; flowers racemose, yellow, glabrous, 12–15 mm. long, few on more or less glandular pedicels 5–10 mm. long; calyces broadly campanulate sparsely glandular hirtellous, about 4 mm. long, the oblongish teeth nearly as long as the tube; pod straight with 3–5 segments densely long plumose appearing shaggy, 1.5–2 cm. long. On rocky slopes and in open mixed formation 3,000 to 3,600 meters.—Cf. *A. vicina*, which at one time seemed to me to be an eglandular form. Raimondi, without data, made two collections. Illustrated, Wedd. Chlor. And. 2: *pl. 79*.

Junín: Prov. Tarma, valley of the Huacata, *Weberbauer 5772*.—Cuzco: Acomayo, *Vargas 220* (det. Standl.). Pisac, rocky canyon, *Pennell 13729*. Ticuani, *Vargas 9828* (det. Standl.). Valle del Paucartambo, (*Herrera 926*). Vilcanota, *Pennell 14189; Weberbauer 7885*.—Moquehua: Torata, *Weberbauer 7481* (det. Johnst.). —Puno: Near Puno, *Soukup 414*. Bolivia and Patagonia. "Ayacaulli."

Adesmia muricata (Jacq.) DC. Ann. Sci. Nat. sér. 1. 4: 94. 1825. *Hedysarum muricata* Jacq. Icon. Rar. 3: 13. *pl. 568*. 1790. *H. pimpinellifolium* Poir. in Lam. Encycl. Suppl. 6: 447. 1804. *Aeschynomene dentata* Lag. Gen. & Sp. Nov. 22. 1816. *A. dentata* (Lag.) DC. Prodr. 2: 319. 1825.

Diffusely branched, the long herbaceous stems and racemes more or less densely viscid puberulent; leaves with 4–7 pairs of oblong-obovate, obtuse or retuse, usually dentate leaflets 6–10 mm. long, about half as wide, lightly pilose or glabrate; pedicels slender, becoming 2.5 cm. long; calyx 4 mm. long, the lanceolate teeth about equaling the tube; banner 8 mm. long; pod deeply sinuate, the several

segments punctate-muricate and sparsely subappressed hirsutulous. —The var. *pimpinellifolia* (Poir.) Burkart has the leaflets conspicuously dentate; the var. **hispidula** (Lag.) Macbr., comb. nov. (*Aeschynomene hispidula* Lag. Gen. & Sp. Nov. 22. 1816; *Adesmia hispidula* (Lag.) DC. Prodr. 2: 319. 1825) is rarely if at all glandular, the pod segments all or part of them with a few plumose setae. Intermediate plants exist: *Weberbauer 7609* is eglandular but the pods merely muricate; *Weberbauer 7202* is somewhat glandular but the pod segments only in part plumose-setose; to care for these Gray, U. S. Expl. Exped. Bot. 1: 435. 1854, designated *A. hispidula*, vars. *subnuda* and *plumosa*. F.M. Neg. 6963 (*A. dentata*).

Lima: *Dombey* (type of the var.). Along the Río Rimac, *Weberbauer 5232* (det. Ulbr.). Dry slopes and rock outcrops, Matucana, *215; 433* (var. *hispidula*). Perruchuco, *Mathews 540*.—Huancavelica: Above Huaytará, 2,700 meters, *Weberbauer 5414* (var. *pimpinellifolia*). Mantaro Valley, *Weberbauer 7609* (toward *A. muricata*, det. Johnst.).—Libertad: Prov. Santiago de Chuco, *Weberbauer 7202* (det. Harms, *A. hispidula;* det. Johnst., *A. muricata*).—Cuzco: Urquillos, rocky clay slopes, 2,882 meters, *Vargas 11092*. Cusohuasi, Prov. Abancay, *Vargas 1258*. Above Pisac, Prov. Calca, 3,300 meters, *Weberbauer 6910* (det. Johnst.).—Arequipa: Atiquipa, (*Raimondi*, var. *hispidula*). Ocoña, (*Raimondi*, as *A. dentata*, i.e. var. *pimpinellifolia*). South to Chile and Patagonia; eastern Brazil.

Adesmia spinosissima Meyen ex Vogel, Obs. Bot. in Nov. Act. Acad. Leop.-Carol. 19: Suppl. 1: 24. 1843.

Intricately branched, spinescent, the branchlets dark brown, early minutely hirtellous; leaves, calyx and banner without sericeous hirtellous; leaflets minute, scarcely 1 mm. long or wide, 4–5 pairs; pedicels several mm. long, little longer than the calyx at anthesis, the calyx-teeth ovate, short; flowers 5–6 mm. long, the keel acute; pod 1 cm. long with 3–4 densely long plumose segments. —Meyen mentioned the name in Reise um die Erde 2: 27. 1835. *A. hystrix* Phil. and *A. melanthes* Phil., to which Peruvian specimens are referred in Weberbauer, 128, 130 and 133, are both as to material seen, better included in Meyen's species. *A. melanthes* has subsessile flowers in the fascicled leaves; *A. hystrix* has pedicels longer than the leaf, this 4–6 mm. long, flowers 8 mm. long, the yellowish banner with violet veins and a central spot; *A. spinosissima* may be obscurely viscid, as *Weberbauer 4826* (El Misti) with glandular-denticulate leaflets; it may be *A. sentis* Phil. if distinct. F.M. Neg. 2230.

Arequipa: Near Arequipa, *Meyen*, type. Near base of El Misti, gravelly soil, *Pennell 13236*. Mt. Chinata, in dry loam, 1 meter, flowers yellow, *Eyerdam & Beetle 22105*.—Ayacucho: Prov. Parinacochas, *Weberbauer 5761*.—Puno: Near Puno, *Soukup 211*.

Adesmia verrucosa Meyen ex Vogel, Obs. Bot. in Nov. Act. Acad. Leop.-Carol. 19: Suppl. 1: 20. 1843.

Shrub, densely glandular glutinous throughout except the yellow flowers and shaggy plumose pods; leaves with 9–12 pairs of broadly obovate or subrotund crenate leaflets about 4 mm. long and broad; racemes terminal, rather many-flowered, the flowers about 1 cm. long on pedicels 6 mm. long; calyx-teeth sublinear, much shorter than the tube, this 4 mm. long; pods to 2 cm. long with 8 or more segments.—Common at the volcano Misti, rocky canyon slopes around 3,000 meters; the yellow petals, especially the banner, are lined with brown. Illustrated, Weberbauer, 127. F.M. Neg. 2237.

Arequipa: Near Arequipa, *Meyen*, type; *Pennell 14275; 13215; Weberbauer 4830; Munz 15495*. Baños de Yura, *Raimondi*.

Adesmia vicina Macbr., spec. nov.

A. miraflorensis ut videtur differt solum haud glandulosis, vexillo leviter piloso, forma et magnitudine calycis, tubo 3–3.5 mm. longo, dentibus distincte brevioribus circa 1.5 mm. longis.—Apparently *A. miraflorensis* is constant in character of glabrous banner, the calyx-teeth nearly as long as the tube so that it seems inadvisable to consider this plant an eglandular variety.

Huancavelica: Prov. Angaraes, left side Río Harpa, 3,250 meters, *Weberbauer 5673* (type, U. S. Nat. Mus.).

55. **POIRETIA** Vent.

Glandular punctate suffrutescent herbs, the Peruvian species twining. Leaves pinnate, the 3 or 4 leaflets often minutely stipulate, the narrow stipules sometimes decurrent at base. Pedicels bracteolate, the flowers as in *Nissolia* but the stamens all connate. Ovary sessile, many-ovuled. Pod linear, the sutures straight or lightly sinuate with oblong or quadrate membranous or subcoriaceous reticulate or finally verrucose segments.—Name conserved.

Poiretia scandens Vent. Choix Pl. 42. *pl. 42*. 1803.

Glabrous with slender subherbaceous branchlets and dark punctate leaves consisting of 2 pairs of obovate or suborbicular

leaflets, 1–3 cm. long; racemes to 2.5 cm. long, often shorter, the yellow flowers 3.5 mm. long; pods about 2.5 cm. long, 3–4 mm. broad.

Piura: Below Ayavaca, 2,000 meters, *Weberbauer 6361*.—Cajamarca: Valley of the Río Tabaconas, 900 meters, *Weberbauer 6167*. West Indies; Mexico; Brazil.

56. WEBERBAUERELLA Ulbrich

Low half-shrub with nodosely tuberiferous roots, the upper parts lightly ashy strigillose and abundantly glandular dotted even to the yellowish papilionaceous flowers. Racemes axillary, shorter than the leaves, these imparipinnate. Bracts narrowly lanceolate borne with the bractlets at base of pedicels. Calyx campanulate, bilabiate, the upper lip bifid, the lower trifid. Banner suborbicular, reflexed, with broad claw nearly equaled by the wings, exceeded by the keel. Stamens 10, connate, the anthers uniform. Ovary stiped with about six partly separated segments, the long style glabrous.—Allied to *Aeschynomene* but differing in bracts, flowers and glandulosity (Ulbrich). Meritoriously commemorates the great Peruvian phytographer.

Weberbauerella brongniartioides Ulbr. Bot. Jahrb. 37: 551. 1906.

Suffrutescent, the virgately branching stems to 3 dm. high; internodes 2–3 cm. long; stipules about 6 mm. long, oblong-lanceolate; leaflets 17–20 pairs, minutely petiolulate, broadly oval, 7–20 mm. long, 3–14 mm. wide, obtuse, truncate or even emarginate, glabrous or nearly above, lightly pilose beneath; stipels minute, promptly caducous; racemes 5–8 cm. long, the several brownish-yellow flowers 15–18 mm. long on pedicels 5–8 mm. long; bracts to 7 mm. long; calyx about 10 mm. long, the two upper lobes oval, the slightly longer lower three lanceolate; banner to 2 cm. long, 18 mm. broad; keel 18 mm. long, the wings about 8 mm. broad at the obtuse tip, auricled; staminal tube to 2 cm. long; petals brownish yellow; ovary stipe 2 mm. long, the style nearly 18 mm. long.—Leaves sensitive (Mexia). Illustrated, l.c. 552. F.M. Neg. 1223.

Arequipa: Mollendo, lomas, *Weberbauer 1513*, type. Sand dunes near the ocean south of Mollendo, *Mexia 04179* (det. Johnst.). Lomas, Ocoña to Camaná, *Raimondi*.

57. ARACHIS L.

Reference: Hoehne, Fl. Bras. 25, pt. 2: 122. 1–20. 1940.

The much appreciated peanut, "mani," is presumably unknown in Peru, except in cultivation; the low semi-prostrate plants with pinnate leaves, these usually with only 2 pairs of broadly oblong elliptic leaflets and axillary flowers are well known for the edible nut-like fruits. The calyx-tube is so long that it appears to be a slender pedicel; the 4 upper lobes of the calyx are connate, the distinct, lowest one narrow. After the small flower has fallen, the ovary descends into the ground by the continued growth of the firm but more or less flexuous stalk or torus; the pod is thus pushed beneath the surface of the earth where it matures.—Cf. Hoehne for an extensive bibliography on the peanut, to which are added two references below.

Arachis hypogaea L. Sp. Pl. 741. 1753; 18.

Annual, the stems more or less villous with spreading hairs; leaflets oblong obovate or broadly oblong, rounded at tip, sparsely ciliate, glabrous above, pubescent or glabrate beneath, commonly 4–5 cm. long, about 2.5 cm. broad; calyx-tube 2–4 cm. long, pilose; flowers yellow, the banner about 1 cm. long; pods typically 3–4 cm. long.—Illustrated, Hoehne, l.c. *pl. 13;* Degener, Fl. Hawaii.

This is the species cultivated as an annual around the world and variable in pubescence, foliage and size of fruits; several wild species are native to Brazil and are said to be perennial. The distinctively Peruvian 3-seeded form, reticulated and elongate pods with a prominent hump, has been found in Ancon graves and is represented on Peruvian pottery. It is, apparently, the type which found its way to the orient; cf. O. Bois, Les Plantes Alimentaires, Paris, 1927; O. Würtenberger, Beihefte zum Tropenpflanzer 13: 1–126. 1917. The following specimens from Peru probably are plants that escaped or were naturalized, although the type locality reads "Brazil, Peru."

Huánuco: Sandy beach along Río Pachitea between Puerto Victoria and Puerto Leguía, *Killip & Smith 26827* (det. Standl.).—Loreto: Mishuyacu, in clearing, *Klug 301*. Puerto Arturo, in chacra, *Williams 5167*. Brazil. "Inchis," "mani."

Arachis prostrata Benth. Trans. Linn. Soc. 18: 159. 1841; 15.

Like the preceding, but the leaflets rather more oblong-obovate, somewhat acutish, much smaller; calyx-tube 4–7 cm. long.—The Peruvian collection presumably introduced. Illustrated, Hoehne l.c. *pl. 9*.

Cuzco: San Miguel, Yurabamba, (*Cook & Gilbert 1740*, fide Hoehne). Northeast Brazil to the middle interior.

58. STYLOSANTHES Sw.

Reference: Taubert, Verh. Bot. Ver. Brandenb. 32: 1–34. 1890.

Diffuse or ascending usually pubescent herbs, the stems sometimes more or less lignescent below. Leaves pinnately 3-foliolate, the estipulate leaflets narrow. Stipules adnate to the petiole. Inflorescence axillary or terminal, densely spicate or capitate, the flowers yellow, subsessile in the axil of a leaf or bract, sometimes accompanied by 2 or 3 bracteoles or by a plumose bristle. Calyx-tube elongate, usually the 4 upper lobes connate. Flowers small with roundish banner, the 10 united stamens with closed sheath, the anthers of the longer subbasifixed, the remaining short versatile. Pod compressed with a hooked beak, the joints 2 or 1 (the lower sometimes abortive).—Burkart, Darwiniana 3: 232–261. 1939, has given a scholarly synopsis of the Argentine species from which I have also compiled.

Flowers (at least the lower) accompanied by a plumose stalk; pods more or less pubescent.

Bracts shortly scabrous hispid; pods usually with only the upper segment fertile; shrubs.

Leaf-nerves faint, unless toward margins; pod-beak about 2.5 mm. long.....*S. scabra.*

Leaf-nerves prominent; pod-beak 1–1.5 (2) mm. long..*S. nervosa.*

Bracts long-villous-setose; pods usually with 2 fertile segments; annual or more or less suffrutescent perennial.

Leaflets 5–15 mm. long.....*S. sympodialis.*

Leaflets elongate.....*S. psammophila.*

Flowers unaccompanied by a bristle; pods glabrous..*S. guianensis.*

Stylosanthes guianensis (Aubl.) Sw. Svensk. Vet. Akad. Handl. 10: 296. 1789; 25. *Trifolium guianense* Aubl. Pl. Guian. 2: 776. *pl. 309.* 1775.

Erect or ascending green but distinctly hispid herb, ordinarily several dm. high; stipules to 1.5 cm. long; leaflets oblong-lanceolate, acutely mucronate, usually 1.5–2 cm. long, 5–8 mm. broad, glabrate or subappressed pubescent, especially beneath; spikes capitate, the primary bracts hispid or echinate with long, usually yellowish tri-

chomes; bract and bracteole narrow or linear; flowers about 6 mm. long; lower segment of pod usually abortive, remaining upper one glabrous, reticulate, 3 mm. long, 2 mm. broad, minutely uncinate-mucronate.—The var. *gracilis* (HBK.) Vog. is the form with lanceolate linear leaflets, the var. *subviscosa* Benth. has slightly viscid long setulose pubescence. The widely distributed *S. viscosa* Sw. is similar but viscid-pubescent, the spikes scarcely capitate. Illustrated, HBK. Nov. Gen. & Sp. 6: *pl. 596* (var. *gracilis*).

Huánuco: On Río Chinchao, *4993*. Cuchero, *Poeppig 1401* (var. *subviscosa*).—Junín: Chanchamayo Valley, *Schunke 1410; 1412; 1518*.—San Martín: Near Moyobamba, 1,100 meters, *Klug 3638*.—Cuzco: Valle de Santa Ana, *Herrera 3614* (distr. as *S. leiocarpa*). Tarapoto, *Belshaw 3361*. South America and Central America.

Stylosanthes nervosa Macbr., spec. nov.

Frutex, ramis glabris, ramulis breviter parceque villosis haud vel paullo hispidis; foliolis rigido-coriaceis, acuminatis vel acutis; bracteis scabro-hispidulosis; bracteolis 2, apice ciliolatis, 1 saepe bifidis, 7 mm. longis; stipite plumosa 3.5–4 mm. longa; legumine uni articulato, articulo inferiore abortivo, 2 mm. longo piloso, superiore 6 mm. longo plus minusve piloso, laxe reticulato et longitudinaliter 1–2-costato rostro apice uncinato circa 1.5 mm. longo.—The type of *S. nervosa* has oblong lanceolate acuminate leaflets to 17 mm. long, 3 mm. wide, calyx 10 mm. long including the 7 mm. long stipe-like tube, the lower lobe pilose, acute, longer than the others, these obtuse, a little ciliate; banner 5.5 mm. long. So far as observed, the bristle is lacking, except in the first bract, but in *Weberbauer 6457*, which may be distinct, the bristle is present in the lower bracts, the pods are pubescent only on the ribs, and sometimes 2 segments are fertile, the calyx-lobes are glabrous, and the shorter leaflets are merely acute.—This collection was referred by Harms to *S. leiocarpa* Vog., a viscid species with glabrous biarticulate pods, the beak nearly as long as the upper segment. *S. nervosa* apparently is rather allied to *S. scabra* Vog. & *S. diarthra* Blake, Proc. Biol. Soc. Wash. 33: 49. 1920, both with lightly nervose leaves; the former moreover has a much more strongly beaked pod, the latter bractlets only 2.5 mm. long, pods with both segments fertile.

Cajamarca: Near confluence of rivers Chinchipe and Marañón, shrub 1 meter high, *Weberbauer 6215*, type.—Huancavelica: Below Colcabamba, *Weberbauer 6457* (det. Harms as *S. leiocarpa*).

Stylosanthes psammophila Harms, Repert. Sp. Nov. 19: 69. 1924.

Densely leafy annual, glabrescent or lightly pilose (the stems lineately so) except the densely brown villous bracts of the short few-flowered spikes; stipules setaceous-tipped; leaflets lanceolate acute, the larger 1.5–4 cm. long, 2–5 mm. broad; primary bracts stipuliform, the inner lanceolate 5–6 mm. long; bractlets 3, 1 lanceolate, 2 narrowly linear; pod 8–9 mm. long with 2 segments, the lower villous, the upper reticulate, glabrous or nearly, with curved beak.—Flowers yellow, the banner brown-striate. *S. sympodialis* Taub. l.c. 19, of Ecuador seems to be very similar but the leaflets are only 5–16 mm. long. F.M. Neg. 2247.

Piura: Between Piura and Hacienda Nomala, in sand with herbs and half shrubs, *Weberbauer 5936*.

Stylosanthes scabra Vog. in Linnaea 12: 69. 1838; 24.

Somewhat suffrutescent villous pubescent with much-branched ascending stems; leaflets ovate-oblong, rather prominently nerved, 5–25 mm. long, 2–9 mm. broad; spikes about 2 cm. long, oblong; primary bracts villous pubescent, little setose, the second bifid; plumose bristle 2–4 mm. long; pod typically with 2 segments or only 1 (fide Taubert), this 2.5 mm. long, the uncinate beak about as long. —Illustrated, Burkart (flowers), 239.

Peru: (fide Bentham). Argentina to Central America; Galapagos Islands.

Stylosanthes sympodialis Taub. Verh. Bot. Ver. Brandenb. 32: 19. 1890.

Stems ascending-erect, suffrutescent at base, lineately villous above where sympodially branched; stipules subscarious, the sheath about 5 mm. long; leaflets elliptic-lanceolate, mucronulate, glabrescent in age, moderately nerved, 5–16 mm. long, 1.5–5 mm. broad; spikes oblong, the primary bract densely brownish-villous; plumose stalk 7 mm. long, lacking in the upper flowers; calyx-teeth ciliolate; pods with 2 segments, 7 mm. long, the lower densely sericeous, the upper reticulate, glabrescent at maturity except the rusty sericeous, uncinate beak, this 1–1.5 mm. long.—*S. gloiodes* Blake, Proc. Biol. Soc. Wash. 33: 45. 1920, Ecuadorian and allied, is conspicuously viscid. F.M. Neg. 2249.

Piura: Amotape Hills, *Haught F. 44; 134*. Southwestern Ecuador.

59. ZORNIA Gmel.

Herbs with digitately 2–4-foliolate leaves, the leaflets often pellucid punctate, estipulate, the stipules with a basal appendage. Flowers remote in spikes or solitary, the peduncles terminal and axillary. Bracts 2 about each sessile flower, the hyaline calyx bilabiate, the 2 upper lobes united into an emarginate lip, the 2 lateral much smaller, the lowest equaling the upper. Stamens as in *Stylosanthes*. Segments of compressed pod indehiscent.

Zornia diphylla (L.) Pers. Syn. Pl. 2: 318. 1807. *Hedysarum diphyllum* L. Sp. Pl. 747. 1753.

More or less pubescent or glabrate annual, becoming diffuse; leaflets 2, lanceolate or the lower elliptical; bracts broadly elliptic to narrowly lanceolate; flowers pale yellow, the banner 8–10 mm. long; pods with 2–6 reticulate, shortly aculeate, glabrous or hirsutulous segments.—Highly variable in pubescence and shape and size of leaf and bract; more than a dozen of these variants have been given taxonomic recognition; cf. Bentham in Mart. Fl. Bras. 15, pt. 1: 80–83, where illustrated, *pls. 21, 22.*

Piura: Serrán, *Weberbauer 5976.*—Lambayeque: Above Olmos, 2,100 meters, *Weberbauer 7103.*—Junín: Chanchamayo, *Diehl 2455.*—Loreto: Balsapuerto, *Klug 3051.*—Cuzco: Prov. Convençión, *Soukup 909.* Warm regions.

60. DESMODIUM Desv.

By Bernice G. Schubert

Herbaceous to frutescent; prostrate to erect. Leaves uni- to trifoliolate (one species in Peru rarely quinquefoliolate), stipulate, petiolate. Leaflets stipellate and petiolulate. Stipules chiefly free, connate in one species, mostly obliquely ovate, long-attenuate, striate, puberulent on dorsal surface and ciliate. Stipels subulate to lance-attenuate, striate, puberulent and ciliate. Petioles mostly sulcate on the adaxial surface and lineate or finely canaliculate; leaf-rachis similar but slenderer and usually shorter. Petiolules stouter than leaf-rachis, darker and densely spreading-pilose, very short. Inflorescence usually racemose to racemose-paniculate, racemes axillary and terminal. Bracts striate, ciliate; primary bracts subtending 1–many pedicels; secondary bracts each usually subtending a single pedicel often present, smaller, usually early deciduous. Calyx 2-lobed, lower lobe with three distinct teeth,

the central one longest, the equal lateral teeth somewhat shorter, upper lobe mostly (short-)bifid. Corolla longer than calyx, with orbicular to obovate standard, unguiculate, often auriculate wings and mostly falcate, unguiculate (and often auriculate) keel-petals, fused above the claws. Stamens diadelphous 9 and 1, the vexillary stamen fused with the tube about one-third its length; stamen tube usually persistent at the base of the mature fruit. Fruit a sessile to stipitate loment, (1) 2-multiarticulate, mostly indehiscent; variously shaped.

More than 200 species in tropical and subtropical regions of the world, excluding Europe and New Zealand.

The Peruvian species of *Desmodium* represent at least four distinct divisions of the genus; the categories will be presented later, after further study.

The greatest contributions to the study of the genus have been made by DeCandolle in his Prodromus and by Schindler in several papers scattered throughout the volumes of Fedde's Repert. Sp. Nov. For many species of which neither type specimens nor photographs of types are available it has been necessary to consider Schindler's annotations authoritative. Where this could not be done with confidence, however, an attempt has been made to give a particularly clear definition of the group and to assign it the most applicable name, in the hope that this choice may be verified or corrected when type specimens are again available.

Articles with dorsal suture straight to deeply concave.

Articles large (to 2.2 cm. long and 2.4 cm. wide), almost orbicular, notched with a shallow angle on the dorsal suture.
D. Poeppigianum.

Articles smaller (not more than 10 mm. long and 5 mm. wide), with the dorsal suture straight, slightly concave or invaginated at the center.

Flowers borne in pairs.

A small secondary bract directly subtending each pedicel; each pair of pedicels further subtended by a larger primary bract.

Leaflets rhombic, rhombic-ovate or rhombic-orbicular, obtuse or rounded at apex; stipe 3–4.6 mm. long.
D. axillare var. *genuinum.*

Leaflets ovate, rather abruptly short-acuminate; stipe 4.6–8 mm. long..... *D. axillare* var. *Sintenisii.*

Secondary bracts lacking, each pair of pedicels subtended only by a primary bract.

Primary bracts soon deciduous, inflorescence lax; calyx puberulent and slightly short-pilose along central tooth of lower lobe.....*D. adscendens.*

Primary bracts persistent, inflorescence dense; calyx long-silky-pilose and ciliate.....*D. barbatum.*

Flowers borne singly (except rarely in *D. canum* more than one in a fascicle), each pedicel subtended by one large primary and 2 smaller secondary bracts.

Loments multiarticulate, dorsal suture straight. Isthmi nearly equaling length of article; plants ascending to erect.....*D. canum.*

Isthmi very narrow; plants mostly repent to ascending.
D. affine.

Loments 2–3-articulate, dorsal suture curved or invaginated; isthmi very narrow.....*D. Wydlerianum.*

Articles with dorsal suture convex to acute.

Pedicels borne in fascicles of 2–several, each fascicle subtended by a narrowly ovate, greenish to stramineous primary bract; each pedicel further subtended by a similar slenderer secondary bract; young inflorescence with fascicles early distinct.

Isthmi central.

Plants prostrate; articles slenderly elliptic, sutures scarcely constricted at isthmi.....*D. scorpiurus.*

Plants decumbent to erect, articles chiefly rhomboidal (excepting occasionally the terminal), sutures rather deeply constricted.

Terminal article regularly much dilated, reniform.
D. glabrum.

Articles essentially equal and alike.

Articles large, up to 4 mm. long.

Leaflets broad (terminal leaflet up to 3 cm.) with prominent reticulation; bracts early deciduous.
D. tortuosum.

Leaflets narrower (terminal leaflet up to 1.5 cm.), venation not prominent, bracts persistent.
D. neo-mexicanum.

Articles small, to 1.5 mm. long.

Rachis of racemes densely stiff-spreading-pilose.
D. micranthum.

Rachis of racemes only uncinulate-puberulent.
D. micranthum var. *Macbridei.*

Isthmi excentric.....*D. campyloclados.*

Pedicels borne in pairs, each pair subtended by a broadly ovate, stramineous to olivaceous primary bract; each pedicel usually further subtended by a smaller (sometimes differently shaped and much thinner) secondary bract; young inflorescence with bracts densely imbricate.

Isthmi central; articles very small, to 3 mm. long.

Leaves unifoliolate.

Stem simple, leaflets lance-ovate, long, to 9.5 cm.; articles orbicular.....*D. sclerophyllum.*

Stem branched, leaflets orbicular-ovate, shorter, to 5.5 cm.; articles rhomboidal.....*D. Perrottetii.*

Leaves trifoliolate only very occasionally some unifoliolate.
D. distortum.

Isthmi excentric; articles larger, 4 mm. long or longer.

Primary bracts small, not more than 3.5 mm. long.
D. cajanifolium.

Primary bracts larger, 5 mm. or more long.

Subscandent to erect plants with usually rather stout stems.

Pubescence of stems chiefly uncinulate.

Stems deeply trisulcate.

Leaflets rhombic-ovate, thin, bright to dark-green above, articles densely uncinulate-pubescent, never contorted.....*D. subsericeum.*

Leaflets ovate-acuminate, thick, coriaceous, veins impressed above.

Bracts long-attenuate.....*D. intortum.*

Bracts short-apiculate.*D. intortum* var. *apiculatum.*

Stems terete to angulate.

Stems densely uncinulate-pubescent.

Leaflets orbicular to rounded-ovate, prominently mucronate.....*D. uncinatum.*

Leaflets narrowly rhombic-ovate, acute to obtuse.
D. limense.

Stems uncinulate-puberulent, becoming glabrous. *D. delotum.*

Pubescence of stems not chiefly (if at all) uncinulate.

Pubescence fulvous throughout, stem densely patent-pilose..... *D. Weberbaueri.*

Pubescence, except on inflorescence, white, stem densely canescent.. *D. Vargasianum* var. *typicum.*

Plants with prostrate or decumbent stems, slenderer.

Plants with thin leaflets, the veins not impressed, leaflets mostly elliptic to ovate.

Articles semirhomboidal to suborbicular, dorsal suture only slightly constricted at isthmi. *D. Vargasianum* var. *ellipticum.*

Articles more nearly orbicular, dorsal suture definitely although not deeply constricted at isthmi.

Leaflets chiefly elliptic and prominently mucronate; bracts large, usually more than 12 mm. long, gradually attenuated for about one-third their length; immature loment usually straight or only slightly curved. *D. Vargasianum* var. *bracteatum.*

Leaflets chiefly ovate, obtuse at apex, not prominently mucronate; bracts usually not more than 1 cm. long, attenuated for about one-half their length; immature loment usually forming an arc of 90°. *D. Vargasianum* var. *arcuatum.*

Plants with thick leaflets, veins deeply impressed above. *D. molliculum.*

Desmodium adscendens (Sw.) DC. Prodr. 2: 332. 1825. *Hedysarum adscendens* Sw. Prodr. 106. 1788. *Meibomia adscendens* (Sw.) O. Ktze. Rev. Gen. 1: 195. 1891.

Suffrutescent, ascending to erect; stem simple to branched, lineate, appressed-pilose; petioles also appressed-pilose, 2.5–3 cm. long, rachis much shorter, 0.5–0.65 cm. long; leaflets elliptic, acute at the apices (or less often obtuse) or (ovate or) obovate and obtuse, (essentially glabrous above to) soft-appressed-pilose on both surfaces, terminal leaflet 2–6 cm. long, 1.4–2.3 cm. wide, lateral leaflets 1.4–4 cm. long, 0.8–1.9 cm. wide; stipules very long-attenuate, 0.3–1.3 cm. long; stipels subulate, 2–4 mm. long; petiolules ca. 2.5

mm. long; inflorescence racemose-paniculate, rachis uncinulate-puberulent and sparsely to densely patent-pilose; primary bracts ovate-attenuate, very early deciduous (never persisting in fruit), 3–5 mm. long, no secondary bracts present; pedicels chiefly pilosulous, 0.7–1.6 cm. long; calyx puberulent and pilose along central tooth of lower lobe, central tooth of lower lobe ovate-acuminate, 3.5 mm. long, lateral teeth 3 mm. long, upper bifid lobe 3 mm. long; standard obovate, retuse, cuneate, 4.5 mm. long, 3 mm. wide, wings obliquely rectangular, 3.5 mm. long, 1.5 mm. wide, keel-petals very broad at apex, 3.5 mm. long, 1.5 mm. broad; loment essentially sessile, to 5-articulate, dorsal suture almost straight, ventral suture curved, constricted at each isthmus; articles uncinulate-pubescent, 5 mm. long and 3 mm. wide.

Loreto: Mishuyacu, near Iquitos, 100 meters, *Klug 1230*. Iquitos and vicinity, 120 meters, *Williams 3572; 7951*. Lower Río Huallaga, 155–210 meters, *Williams 3855*. La Victoria on the Amazon River, *Williams 2773*. Alto Río Itaya, 145 meters, *Williams 3233; 3333*. Lower Río Nanay, *Williams 277; 410; 364; 464*.—San Martín: San Roque, 1,350–1,500 meters, *Williams 7207*.—Junín: Chanchamayo Valley, 1,200 meters, *Schunke 313; 364 p.p.*; 1,500 meters, *306; 490*. Schunke Hacienda, above San Ramón, 1,300–1,700 meters, *Schunke A110; A112*.—Peru-Colombia Border: Río Putumayo, *Klug 1644*. Through the West Indies and tropical continental America.

Desmodium affine Schlecht. in Linnaea 12: 312. 1838.

Herbaceous, ascending; stem moderately spreading-pilose with fine long soft trichomes and minutely puberulent with very short hooked ones; petioles with pubescence similar to that of the stem, 2–3.5 cm. long, rachis 0.3–0.5 cm. long; leaflets dark-green and long-appressed-pilose above, beneath paler with shorter denser pilosity and the midrib and chief lateral veins prominent, terminal leaflets ovate-rhombic to almost orbicular, with obtuse apex and mostly acute base, 2–3.5 cm. long, 1.6–2.5 cm. broad, lateral leaflets mostly obliquely ovate, with obtuse apex and chiefly rounded base, 1.6–2.7 cm. long and 1.2–1.8 cm. wide; stipules ovate-acuminate, striate, long-ciliate, 4–7.5 mm. long; stipels subulate, ciliate, puberulent, 2–3 mm. long; petiolules pilose, ca. 2 mm. long; inflorescence axillary, racemose, rachis minutely puberulent; primary bracts slenderly ovate, striate, puberulent and ciliate, ca. 3 mm. long, secondary bracts slender, ciliate, ca. 1.5 mm. long, both types early deciduous;

pedicels puberulent, 1–1.5 cm. long; calyx puberulent and somewhat pilose, teeth of lower lobe acuminate and almost equal, 3–3.5 mm. long, upper bifid lobe 3–3.6 mm. long; standard obovate, rounded above, ca. 6 mm. long and 5 mm. broad; wings obliquely elliptic, broadly obtuse at apex, short-unguiculate, ca. 6.5 mm. long; keel-petals more narrowly elliptic and longer unguiculate, ca. 6 mm. long; loment short-stipitate, to 5-articulate, articles rectangular, with dorsal suture essentially straight and ventral curved, constricted at the isthmi, articles densely uncinulate-puberulent, up to 5.5 mm. long and 3 mm. wide.—This specimen agrees more closely with the description of *D. affine* than that of any other species; authentic material, however, has unfortunately not been available.

Cuzco: Prov. Convençión, Hacienda Potrero, 1,350 meters, *Vargas 1731*. Northern half of South America.

Desmodium axillare (Sw.) DC. var. **genuinum** Urb. Symb. Ant. 2: 303. 1900; Schubert in Contr. Gray Herb. 135: 79–81, 89. map 1. *pl. 1, figs. A15–21*. 1941. *D. axillare* (Sw.) DC. Prodr. 2: 333. 1825. *Hedysarum axillare* Sw. Prodr. 107. 1788; Fl. Ind. Occ. 1274. 1806 emend. *Meibomia axillaris* (Sw.) O. Ktze. Rev. Gen. 1: 195. 1891. *Nephromeria axillaris* (Sw.) Schindl. in Repert. Sp. Nov. 20: 284. 1924. *D. axillare* (Sw.) DC. var. *a genuinum* Urb. Symb. Ant. 2: 303. 1900. *M. axillaris* (Sw.) O. Ktze. var. *a obtusifoliola* O. Ktze. loc. cit. *D. axillare* (Sw.) DC. var. *a obtusifoliola* (Ktze.) Urb. op. cit. 4: 291. 1905. *N. axillaris* (Sw.) Schindl. var. *a obtusifoliola* (O. Ktze.) Schindl. loc. cit. *H. reptans* Poir. in Lam. Encycl. 6: 422. 1804. *D. reptans* (Poir.) DC. loc. cit. *M. reptans* (Poir.) O. Ktze. op. cit. 1: 198. 1891. *D. radicans* Macfad. Fl. Jam. 1: 269. 1837. *Meibomia andina* Rusby in Mem. Torrey Club 3, pt. 3: 21. 1893, as to isotypes in Gray Herbarium, Missouri Botanic Garden and the U. S. National Herbarium, not as to type in the herbarium of the N. Y. Botanical Garden.

Herbaceous, stem repent, rooting at the nodes; rather finely striate, terete to subangular, uncinulate-puberulent; internodes 11–13 cm. long; petioles rather densely uncinulate-pubescent and moderately patent-pilose, 3.6–11.5 cm. long; rachis mostly short patent-pilose up to 5 mm. long; petiolules 2.3–4 mm. long; leaflets glabrescent to short-appressed-pilose above, prominently reticulate and rather densely pilose below, slightly revolute, ciliate, densely so about base, terminal leaflets ovate-elliptic to ovate,

rhombic or less often orbicular or cuneate, broadly acute to almost rounded at apex, acute, obtuse or becoming rounded at base, 4–9 cm. long, 2.5–5.5 cm. wide, lateral leaflets obliquely ovate or ovate-elliptic, obtuse, acute or short-acuminate, 3.4–8 cm. long, 2.2–4.5 cm. wide; connate stipules ovate with long-acuminate to filiform apices, 4.8–6 mm. long, ±5 mm. wide (fused); stipels rather early deciduous, 1.3–4 mm. long; inflorescence axillary, rachis finely striate, uncinulate-puberulent; bracts ovate-acuminate, 2.5–4.5 mm. long, 1.5–2.5 mm. wide; pedicels with uncinulate pubescence and short, stiff, straight hairs, 0.5–1.7 cm. long; calyx with central tooth of lower lobe 2.5–3.5 mm. long, lateral teeth 2–3 mm. long, upper lobe bifid, 2–2.6 mm. long; corolla about twice as long as calyx, standard 4–4.6 mm. long, 3–5 mm. wide, wings 3.5–4.5 mm. long, 1.8–2.6 mm. wide, keel-petals 3–4.6 mm. long, 2.2–3.5 mm. wide; loment stipitate, 1–3-, mostly 2-articulate, spreading-uncinulate-pilosulous along sutures and stipe, uncinate-pubescent over surface, stipe 3–4.6 mm. long, subterminal article (5.5) 6–10 mm. long, (4.4) 4.6–5.5 mm. wide, terminal article 5.8–7 mm. long, 4–4.8 mm. wide.

Loreto: Yurimaguas, lower Río Huallaga, ca. 135 meters, *Killip & Smith 27629*. Mishuyacu near Iquitos, *Klug 482*. Along Río Itaya, *Williams 124; 197*. Lower Río Nanay, *Williams 270; 459*. Iquitos and vicinity, *Williams 3684*.—San Martín: San Roque, *Williams 7271*.—Huánuco: Pampayacu (Cuchero), *Poeppig 1536*. Prov. Huánuco, *Stork & Horton* (U. of Cal. Exped.) *9580*.—Junín: Chanchamayo Valley, *Schunke 375*.—Cuzco: Prov. Convención, Hacienda Potrero, 1,300 meters, *Vargas 1699*. Southernmost Mexico; Central America; West Indies; South America south to Bolivia; Paraguay; Brazil.

Desmodium axillare (Sw.) DC. var. **Sintenisii** Urb. Symb. Ant. 2: 303. 1900; Schubert in Contr. Gray Herb. 135: 87, 89. map 3. *pl. 1, figs. A1–7*. 1941. *D. axillare* (Sw.) DC. var. γ *Sintenisii* Urb. loc. cit. *Meibomia Sintenisii* (Urb.) Britton in Britton & Wilson, Sci. Surv. Porto Rico & Virgin Isl. 5: 402. 1924. *Nephromeria axillaris* (Sw.) Schindl. var. γ *Sintenisii* (Urb.) Schindl. in Repert. Sp. Nov. 20: 284. 1924. *M. albida* Blake in Contr. U. S. Nat. Herb. 24: 5. 1922.

Habit of var. *genuinum;* leaflets dark green and dull or sublucid above with veins more or less prominent, glabrous or with short, rather sparse puberulence mostly along midrib and veins, lower sur-

face much paler, densely short-appressed-pilose, with venation quite prominently reticulate and with margins only slightly, if at all, revolute; leaflets all ovate-acuminate, broadly acute to rounded at base (somewhat obliquely so in lateral leaflets), becoming rather abruptly acuminate at apex, terminal leaflets 6.5–10 cm. long, 4–6 cm. wide, lateral leaflets 6–9.5 cm. long, 3–5.5 cm. wide; pedicels up to 2 cm. long; loment stipitate, stipe 4.6–8 mm. long.

Loreto: Above Pongo de Manseriche, mouth of Río Santiago, *Mexia 6364*. Central America; the Greater Antilles; Colombia; British Guiana; northwestern Brazil.

Desmodium barbatum (L.) Benth. & Oerst. in Kjoeb. Vid. Medd. 1853: 18. 1854. *Hedysarum barbatum* L. Syst. ed. 10. 1170. 1759. *Nicolsonia barbata* (L.) DC. Mém. Lég. 7: 313. 1825. *Meibomia barbata* (L.) O. Ktze. Rev. Gen. 1: 195. 1891. *H. villosum* Mill. Gard. Dict. ed. 8. no. 9. 1768. *D. villosum* (Mill.) DC. Prodr. 2: 338. 1825. *N. villosa* (Mill.) Cham. & Schlecht. in Linnaea 5: 584. 1830. *M. villosa* (Mill.) O. Ktze. op. cit. 198. *N. cayennensis* DC. Mém. Lég. 7: 314. *pl. 51*. 1825. *M. cayennense* (DC.) O. Ktze. op. cit. 197. *N. cayennensis* DC. var. *β obovata* DC. loc. cit. *H. venustulum* HBK. Nov. Gen. & Sp. 6: 519. 1824. *N. venustula* (HBK.) DC. loc. cit.

Habit variable, prostrate or ascending to erect; stem, branches, petioles and inflorescence white-spreading-pilose throughout, or plant chiefly and densely fulvous-pilose; leaves uni- to tri-foliolate; petioles 0.5–1.5 cm. long; rachis 0.3–0.5 cm. long; petiolules 1–3 mm. long; leaflets oval to elliptic-obtuse, usually mucronate, often retuse, sparsely appressed-pilose above, densely so beneath, terminal leaflets 1.4–4.5 cm. long, ca. 0.8–1.8 cm. wide, lateral leaflets similar, a little smaller; stipules conspicuous and persistent, 5–12 mm. long; stipels 0.5–5 mm. long; inflorescence of short, congested, rather densely flowered racemes, the long pubescence of the bracts and calyces obscuring its form; bracts rather long-persistent, (5) 6–6.5 mm. long; pedicels moderately uncinulate-pilosulous, reflexed at apex at least at maturity of flowers, 7–7.5 mm. long; calyx long-silky-pilose and ciliate, deeply lobed, central tooth of lower lobe 4.5 (5) mm. long, equaling lateral teeth, upper lobe deeply bifid, teeth ovate-attenuate; standard obovate, somewhat unguiculate, 5 mm. long, 3.5 mm. wide, wings oblong, obtuse, clawed, 4.5 mm. long, up to 2 mm. wide, keel-petals truncate at apex, 4+ mm. long, 1 mm. wide at apex; loment 1–4-articulate, straight along dorsal

suture, somewhat curved below, isthmi nearly equaling width of article, articles separating easily but sutures at least not early dehiscent, uncinulate-pubescent, 2–2.5 mm. long, 2 mm. wide.

Loreto: Balsapuerto, ca. 220 meters, *Klug 3050.*—San Martín: Alto Río Huallaga, 360–900 meters, *Williams 5633; 5837.* San Roque, 1,350–1,500 meters, *Williams 7440; 7669.*—Junín: Chanchamayo Valley, 1,000 meters, *Schunke 1421.* Mexico; Central America; West Indies; the northern two-thirds of South America.

Desmodium cajanifolium (HBK.) DC. Prodr. 2: 331. 1825. *Hedysarum cajanifolium* HBK. Nov. Gen. & Sp. 6: 525. *pl. 598.* 1824. *Meibomia cajanifolia* (HBK.) O. Ktze. Rev. Gen. 1: 195. 1891.

Herbaceous and somewhat woody below to shrubby, stem erect, simple to branched, finely striate, chiefly uncinate-pubescent, occasionally also pilose; petioles stout, 1.25–4 cm. long; rachis 0.4–1.5 cm. long; petiolules 1–4 mm. long; stipules persistent, 3–7 mm. long; stipels 3–4 mm. long; leaflets ovate (acute to) obtuse, green, sublucid, glabrescent to short-puberulent above, densely soft-appressed to -spreading-pilose with prominent venation beneath, terminal leaflets 5–9.5 cm. long, 2.2–4.3 cm. wide, lateral leaflets 4.5–7 cm. long, 2.5–3.5 cm. wide; inflorescence racemose-paniculate, rachis striate, uncinate-pubescent; primary bracts up to 3.5 mm. long, secondary bracts very small, both types early deciduous; pedicels slender, uncinulate-puberulent, 4–5 mm. long; calyx with central tooth of lower lobe 2.5–3 mm. long, lateral teeth equaling central one, upper bifid lobe 2–3 mm. long; standard acute at base, 7–7.5 mm. long, 4–6.5 mm. wide, wings 7.5–8.5 mm. long, 2.5–3.5 mm. wide, keel-petals scythe-shaped, 7.5–8 mm. long, ca. 2 mm. wide; loment subsessile, up to 6-articulate, articles semiorbicular, almost straight on dorsal suture, softly uncinulate-puberulent throughout, ca. 5 mm. long and 3 mm. wide.

San Martín: Chazuta, Río Huallaga, ca. 260 meters, *Klug 4071* (rachis fulvous spreading pilose). Zepelacio, near Moyobamba, 1,200–1,600 meters, *Klug 3402.* Tarapoto, 750 meters, *Williams 6147.* Prope Tarapoto, *Spruce 4605.* Lamas, 840 meters, *Williams 6451.* San Roque, 1,350–1,500 meters, *Williams 7117; 7499.*—Huánuco: Pozuzo, ca. 650 meters, *Macbride 4600;* Pampayacu, hacienda at the mouth of Río Chinchao, ca. 1,200 meters, *Macbride 5075.*—Junín: Chanchamayo Valley, 1,000 meters, *Schunke 360;* 1,200 meters, *Schunke 1538.* La Merced, ca. 650 meters, *Macbride*

5227.—Cuzco: Prov. Calca, Lares Valley between Calca and Pasto Grande, *Weberbauer 7931*. Prov. Convención, Potrero, 1,300 meters, *Vargas 1840*.—Ayacucho: Aina, between Huanta and Río Apurímac, 750–1,000 meters, *Killip & Smith 22516*.—Indefinite: *Bonpland 44*. Mexico; Panama; Colombia; Venezuela; Brazil; Bolivia.

Desmodium campyloclados Hemsl. Biol. Centr. Am. Bot. 1: 276. 1880. *Meibomia campyloclada* (Hemsl.) O. Ktze. Rev. Gen. 1: 197. 1891. *D. immerens* Macbr. in Field Mus. Bot. 11: 23. 1931.

Vine; stem somewhat ridged and grooved, glabrescent to usually uncinulate-puberulent and moderately spreading-pilose; petioles 1.2–5.2 cm. long; rachis similar, 0.7–2 cm. long; petiolules 2–4 mm. long; leaflets pale beneath with midvein and chief laterals very light and conspicuous, soft-pilose on both surfaces, ovate-elliptic or ovate, mucronate, obtuse to broadly acute at base and apex, terminal leaflet 4.5–7.5 cm. long, 2.7–3.2 cm. wide, lateral leaflets 2.5–6.5 cm. long, 1.5–3.5 cm. wide; stipules pilose or puberulent within, 7–9 mm. long; stipels 3–6 mm. long; inflorescence racemose-paniculate, rachis uncinulate-pubescent and (densely to) sparsely pilose; bracts early deciduous, primary bracts up to 4 mm. long, 1.5 mm. wide, secondary bracts 2–2.5 mm. long, more or less persistent until maturity of fruit; pedicels puberulent, 1.3–2.1 cm. long; calyx with central tooth of lower lobe 4.5 mm. long (including tube), lateral teeth 4 mm. long, upper lobe bifid to entire, 4 mm. long; corolla with standard semiorbicular, becoming narrower to the acute base, 1 cm. long, 7 mm. wide above, wings ca. 9 mm. long, 4 mm. wide; loment stipitate, to 5-articulate, articles obtusely angled to rounded below, almost straight above, up to 9 mm. long, 5 mm. wide, uncinulate-pubescent throughout.

Huánuco: Yanano, ca. 2,000 meters, *Macbride 3725*. Muña, ca. 3,200 meters, *Macbride 4000* (type of *D. immerens*).—Junín: Huacapistana, 1,800–2,400 meters, *Killip & Smith 24166*.—Cuzco: Prov. Convención, terraces of Machu-picchu, *Hunnewell 16028*. Machu-picchu, 2,000–3,000 meters, *Vargas 1868;* 2,400 meters, *Vargas 944* (an almost glabrous form).—Ayacucho: Ccarrapa, between Huanta and Río Apurímac, 1,000 meters, *Killip & Smith 22452*.—Indefinite: *Mathews 3261*. Costa Rica; Nicaragua; Colombia.

Desmodium canum (Gmel.) Schinz & Thellung in Mém. Soc. Neuchât. Sci. Nat. 5: 371. 1914. *Hedysarum canum* Gmel. Syst. Veg. 2, pt. 2: 1124. 1791. *Meibomia cana* (Gmel.) Blake in Bot. Gaz.

78: 276. 1924. *H. racemosum* Aubl. Pl. Guian. 2: 774. 1775. *H. frutescens* sensu Jacq. Hort. Bot. Vindob. 3: 47. *pl. 89.* 1776. *D. frutescens* (Jacq.) Schindl. in Repert. Sp. Nov. 21: 9. 1925. *H. supinum* Sw. Prodr. 106. 1788 (not Chaix ex Villars, 1779–80). *D. supinum* (Sw.) DC. Prodr. 2: 332. 1825. *M. supina* (Sw.) Britton in Ann. N. Y. Acad. Sci. 7: 83. 1892. *H. incanum* Sw. op. cit. 107 (not Thunb. Fl. Jap. 1784). *D. incanum* (Sw.) DC. loc. cit. *M. adscendens β incana* (Sw.) O. Ktze. op. cit. 195. *H. racemiferum* Gmel. op. cit. 1125. (?)*D. racemiferum* DC. op. cit. 331. *M. racemifera* (DC.) O. Ktze. op. cit. 198.

Suffrutescent; stem mostly simple, slender, erect, glabrescent to uncinulate-puberulent, sometimes also moderately pilose; petioles 0.4–1.5 cm. long; rachis 0.3–0.8 cm. long; petiolules 1.5–3 mm. long; leaflets coriaceous, dull to shining and essentially glabrous or finely puberulent above, paler and soft-appressed-pilose beneath, mostly elliptic to elliptic-ovate, obtuse at base and acute at apex, terminal leaflets 3.5–6 cm. long, 1.5–3 cm. wide, lateral leaflets 2–3.8 cm. long, 1–2 cm. wide; stipules chiefly connate, 6–10 mm. long; stipels 4–5 mm. long; inflorescence usually a simple axillary or terminal raceme, rachis subangulate to shallowly canaliculate, finely uncinulate-puberulent and sometimes sparsely patent-pilose; primary bracts persistent, each subtending a single pedicel, 2.5–4.5 mm. long, each pedicel further subtended by two similar smaller secondary bracts; pedicels finely uncinulate-puberulent, 0.6–1.1 cm. long; calyx with central tooth of lower lobe narrowly acute, 4 mm. long, lateral lobes broader, ca. 3–3.5 mm. long, upper bifid lobe 3 mm. long; standard obovate, retuse, cuneate, ca. 5 mm. long and wide, wings ca. 5 mm. long and 2 mm. wide, keel-petals ca. 5 mm. long and 1.5 mm. broad; loments stipitate, up to 7-articulate, articles almost quadrangular in outline but with ventral suture somewhat curved and slightly constricted, dorsal suture essentially straight, surfaces densely uncinulate-pubescent, ca. 4 mm. long and 2.5 mm. broad, isthmi equal to about two-thirds the width of the article.

Loreto: Lower Río Huallaga, 155–210 meters, *Williams 3948; 3976.*—San Martín: Alto Río Huallaga, 360–900 meters, *Williams 5780.*—Cuzco: Prov. Convención, hacienda Potrero, 1,300 meters, *Vargas 1741.* Florida; southernmost Mexico; the West Indies; Guiana; Brazil. Also in Africa according to Fawcett & Rendle.

Desmodium delotum Macbr. in Field Mus. Bot. 8: 102. 1930.

Suffrutescent, trailing-ascending; stem uncinate-puberulent, becoming glabrous; petioles up to 3.2 cm. long; rachis similar, up to

1 cm. long; petiolules 3–3.5 mm. long; leaflets coriaceous, puberulent and shining above, dull and pilose beneath, terminal leaflet lance- to rhombic-ovate, up to 5.5 cm. long and 3.8 cm. broad, lateral leaflets elliptic to ovate, up to 5 cm. long and 2.6 cm. broad; stipules ca. 2 mm. long and broad; stipels slender, 2–3 mm. long; inflorescence racemose-paniculate, rachis uncinate-pubescent; bracts very early deciduous; pedicels puberulent, up to 1 cm. long; calyx-tube 2 mm. long, central tooth of lower lobe 2.5 mm. long, lateral teeth ca. 1.5 mm. long, upper lobe bifid, with short overlapping teeth, 2 mm. long; standard 6–8 mm. long, 4–5 mm. broad, wings suboblong, 6.5–7 mm. long, 2.5 mm. broad, keel-petals 6–8 mm. long, 2.5–3 mm. broad; loment short-stipitate, 4-articulate, articles semielliptic, uncinulate-puberulent, ca. 5 mm. long and 2 mm. broad.

Junín: La Merced, ca. 650 meters, *Macbride 5279* (type). Endemic.

Desmodium distortum (Aubl.) Macbr. in Field Mus. Bot. 8: 101. 1930. *Hedysarum distortum* Aubl. Pl. Guian. 2: 774. 1775. *Meibomia distorta* (Aubl.) Schindl. in Repert. Sp. Nov. 22: 281. 1926 (not op. cit. 20: 148. 1924).

Shrub, ca. 2 meters high, slender; stem terete to angulate, striate, uncinulate-pubescent; leaflets (1) 3-foliolate, petioles 2–3 cm. long; rachis 0.3–1.3 cm. long; stipules often clasping, 1–1.8 cm. long; petiolules 2–3.5 mm. long; stipels 4–7 mm. long; leaflets elliptic-ovate to ovate, appressed-pilose and uncinulate-puberulent above, softly appressed-pilose (and sometimes uncinulate-puberulent) beneath and prominently reticulate-veined, terminal leaflets 5–9 cm. long, 2–7.3 cm. wide, lateral leaflets 3.5–4.2 cm. long, 1.6–2.5 cm. wide; inflorescence racemose-paniculate, rachis puberulent and very finely patent-pilose; pedicels rather densely spreading pilose, 4–5 mm. long (in Peruvian specimens); primary bracts ca. 2.5 mm. long; secondary bracts ca. 1 mm. long; calyx with central tooth of lower lobe 3 mm. long, lateral teeth 2.2–2.8 mm. long, upper bifid lobe 1.9–2.5 mm. long; standard 5 mm. long and 2.5–3.5 mm. wide, wings 3.5–4.5 mm. long and 1.5–2 mm. wide, keel-petals 4.5–5.5 mm. long and 2 mm. wide; loment stipitate, up to 6-articulate, articles orbicular, ca. 2.5 mm. long and broad, lower 2–3 articles puberulent, the rest essentially glabrous (in Peruvian specimens).—*Mathews*, collected in 1846, has large broad leaflets and no pilosity on the stem. It seems intermediate between *D. distortum* and *D. Perrottetii;* from the latter, however, it differs in its very broad stipules, essentially glabrous upper articles and trifoliolate leaflets.

Huánuco: Yanano, ca. 2,000 meters, *Macbride 3792*. Muña, ca. 3,200 meters, *Macbride 3988*.—Indefinite: *Mathews*.

Desmodium glabrum (Mill.) DC. Prodr. 2: 338. 1825. *Hedysarum glabrum* Mill. Gard. Dict. ed. 8. no. 12. 1768. *Meibomia glabra* (Mill.) O. Ktze. Rev. Gen. 1: 198. 1891. *H. molle* Vahl, Symb. Bot. 2: 83. 1791. *D. molle* (Vahl) DC. op. cit. 332. *M. mollis* (Vahl) O. Ktze. loc. cit. *H. terminale* Rich. in Act. Soc. Hist. Nat. Paris 1: 112. 1792. *D. terminale* (Rich.) DC. op. cit. 327. *M. terminalis* (Rich.) O. Ktze. loc. cit. *D. campestre* Brandegee in Univ. Calif. Pub. Bot. 6: 53. 1914.

Herbaceous, erect; stem mostly simple, striate, densely retrorsely to spreading-pilose, rarely up to 1 meter high; petioles 0.7–4.5 cm. long; rachis 0.4–1 cm. long; petiolules 1–2.5 mm. long; leaflets mucronate, chartaceous, lance- to rhombic-ovate, softly glandular-pilose above, densely pilose with rather conspicuous venation beneath, terminal leaflet 3–5.8 cm. long, 1.3–2.8 cm. wide, lateral leaflets somewhat oblique, 2–4 cm. long, 0.7–1.6 cm. wide; stipules 3–5.5 mm. long; stipels 1–3.5 mm. long; inflorescence racemose, racemes axillary and terminal, rachis ridged and grooved, uncinulate-pubescent and spreading pilose; primary bracts 3–5.5 mm. long; secondary bracts ca. 1.5 mm. long; pedicels finely spreading-pilose, 6.5–9 mm. long; calyx-tube 1.25 mm. long, central tooth of lower lobe 2.5 mm. long, lateral teeth 2 mm. long, upper bifid lobe 2 mm. long; standard 3.25 mm. long, 2.25 mm. broad, wings obliquely oblong, unguiculate, 3 mm. long, 1 mm. broad, keel-petals 3 mm. long, 1.75 mm. broad; loment essentially sessile, 4–6-articulate, terminal article orbicular to reniform, ca. 7 mm. long and 6 mm. wide, uncinulate-puberulent and pilose, subterminal articles uncinulate-pubescent on surfaces, hispid on margins which are strongly and alternately revolute, very small.—F.M. Neg. 21838 (*H. molle*).

Piura: Between Piura and the Hacienda Nomala, 100–250 meters, *Weberbauer 5937*. Pariñas Valley, *Haught F-43; 137*.—Huancavelica: Río San Bernardo, 1,400–1,500 meters, *Weberbauer 6561*.—Indefinite: ex *Herb. Richard* (frag. of type of *H. terminale*). Southern Mexico; Central America; most of the West Indies; the northern third of South America.

Desmodium intortum (Mill.) Urb. Symb. Ant. 8: 292. 1920. *Hedysarum intortum* Mill. Gard. Dict. ed. 8. no. 11. 1768. *Meibomia intorta* (Mill.) Blake in Bot. Gaz. 78: 286. 1924. *Hedysarum*

trigonum Sw. Prodr. 107. 1788. *D. trigonum* (Sw.) DC. Prodr. 2: 332. 1825.

Liana or suberect herb; stem unbranched, slender, trisulcate and lineate, densely uncinate-pubescent and sometimes also rather densely spreading-pilose; petioles (1.8) 3–5.5 cm. long; rachis 0.6–1.2 cm. long; petiolules 3 mm. long; leaflets ovate-acuminate, mucronate, rounded at base, shining and glandular-uncinulate-puberulent or -pilose or both above, paler and pilose beneath, terminal leaflet 3.5–7.5 cm. long, 1.5–4.5 cm. wide, lateral leaflets 2.2–6 cm. long, 1–3.3 cm. wide; stipules up to ca. 7 mm. long; stipels ca. 3–5 mm. long; inflorescence racemose, racemes axillary and terminal, rachis densely uncinate-pubescent; primary bracts up to 8 mm. long; secondary bracts not always present; pedicels uncinulate-puberulent (to glabrescent in age), 6–8 mm. long; calyx puberulent and somewhat pilose on the teeth, central tooth of lower lobe 5 mm. long, lateral teeth 4 mm. long, upper bifid lobe 4 mm. long; standard 9 mm. long, 6 mm. broad, wings subelliptic, 8 mm. long, 3 mm. broad, keel-petals subfalcate, 8 mm. long, 3 mm. broad; loment stipitate, to 9-articulate, articles semirhomboid to semi-orbicular, 4 mm. long and 2 mm. wide, isthmi excentric, narrow.

San Martín: Zepelacio, near Moyobamba, ca. 1,100 meters, *Klug 3629*.—Huánuco: Muña, ca. 2,300 meters, *Macbride 3999*. Mexico; Central America; most of South America.

Desmodium intortum var. **apiculatum** Schubert, var. nov., *D. intorto* simillima, bracteis primariis, apiculatis, 5–10 mm. longis.

Huánuco: Huacachi, estacion near Muña, ca. 2,150 meters, *Macbride 4072*. Dist. Churubamba, Hacienda Exito, islet in Río Cayumba, 1,150 meters, *Mexia 8158* (type in Herb. Field Mus.).—Cuzco: Valle del Apurímac, February, 1929, *Herrera s.n.*—Apurímac: Andahuailas, *Herrera 1489*.

Desmodium limense Hook. Bot. Misc. 2: 215. 1831. *Meibomia limensis* (Hook.) O. Ktze. Rev. Gen. 1: 198. 1891. (?)*D. peruvianum* Vogel in Meyen, Nov. Act. Acad. Leop.-Carol. 19: Suppl. 1: 30. 1843.

Herbaceous, decumbent to ascending; stem slender, canaliculate, uncinulate-puberulent and pilose, sometimes sparsely so; petioles 1.5–3.5 cm. long; rachis 0.4–1 cm. long; petiolules 1–1.5 mm. long; stipules to 6.5 mm. long, not usually very long-persistent; stipels 3.5 mm. long; leaflets thin, somewhat shining and glabrescent to rather densely uncinulate-puberulent and appressed-pilose above

(sometimes with a paler region along the midrib, but only rarely), rather densely appressed-pilose beneath, with midrib and chief lateral veins prominent, terminal leaflets mostly rhombic-ovate, obtuse to acutish, 2–5.8 cm. long, 1.2–3 cm. wide, lateral leaflets mostly elliptic, 1.7–5.3 cm. long, 1–2 cm. wide; inflorescence racemose, rachis uncinulate-puberulent and patent-pilose (or only uncinulate-puberulent); primary bracts 5–8 mm. long; secondary bracts not seen; pedicels uncinulate-puberulent, 4–5.5 mm. long; calyx puberulent and sometimes pilose, central tooth of lower lobe 5 mm. long, lateral teeth 4 mm. long, upper bifid lobe 3.5 mm. long; standard 6 mm. long, 5 mm. wide, wings 6 mm. long, 2 mm. wide, keel-petals 6 mm. long, 2.5 mm. wide; loment stipitate, to 8-articulate, articles uncinate-pubescent, semielliptic, ca. 4 mm. long and 2.5 mm. broad.—Schindler considered *D. peruvianum* a synonym of *D. limense*. Vogel in describing Rio species indicates a close relationship with *D. cajanifolium*. I have seen no authentic material of *D. peruvianum*, nor, in fact, any material so identified.

Lima: Magdalena near Lima, *Née*. Lima and Peruvia septentrionalis, *Cuming 1024*. Lima, *Seeman 757*. Regione inferiori Andium Peruviae, in convalle fluminis Rimac, 1,500–1,600 meters, *Ball 6*. The west slopes of the Andes from Ecuador to middle Chile and the Galapagos Islands (according to Schindler).

Desmodium micranthum (Schindl.) Macbr. in Field Mus. Bot. 8: 101. 1930. *Meibomia micrantha* Schindl. in Repert. Sp. Nov. 22: 283. 1926.

Suffrutescent; stem shallowly canaliculate, uncinate-pubescent, becoming glabrous; petioles up to 5 cm. long; rachis to 2 cm. long; petiolules 2–3 mm. long; leaflets thin, appressed-pilose on both surfaces, terminal leaflet ovate-lanceolate to ovate, obtuse to acutish at apex, cuneate at base, up to 8 cm. long and 4 cm. broad, lateral leaflets smaller, oblique; stipules abruptly narrowed from a broad base, early deciduous, up to 5 mm. long; stipels 3–5 mm. long; inflorescence broadly paniculate, panicles axillary and terminal, spreading, rachis stiff-patent-pilose; primary bracts persistent, up to 4 mm. long; secondary bracts similar, smaller; pedicels slender, puberulent, 6–10 mm. long; calyx pilose, central tooth of lower lobe 2 mm. long, lateral teeth ca. 1.5 mm. long, upper bifid lobe 1.5 mm. long; (in young flower) standard ca. 2 mm. long, 1.5 mm. wide, wings obliquely oblong, 1.5± mm. long, less than 1 mm. wide, keel-petals equaling wings; loment (very immature) subsessile, up

to 6-articulate, articles rhomboidal, uncinulate-pubescent and somewhat pilose, 1–1.5 mm. long.—F.M. Neg. 2917.

Lambayeque(?): Uber Olmos, *Weberbauer* (fragment of type). Endemic.

Desmodium micranthum var. **Macbridei** Schubert, var. nov., *D. micrantho* simile, rhachi inflorescentiae uncinulato-pilosulo.

Indefinite: *Weberbauer 5988* (type in Herb. Field Mus.). Endemic.

Desmodium molliculum (HBK.) DC. Prodr. 2: 331. 1825. *Hedysarum molliculum* HBK. Nov. Gen. & Sp. 6: 519. 1824. *Meibomia mollicula* (HBK.) O. Ktze. Rev. Gen. 1: 198. 1891.

Prostrate, stem ridged and grooved, densely patent-pilose with soft white trichomes; petioles short, to about 1.3 cm. long; rachis to ca. 0.5 cm. long; petiolules ca. 1.5 mm. long; leaflets subrhombic to orbicular, retuse, usually mucronate, with the thick veins mostly impressed above, prominent on the paler lower surface, both surfaces appressed-pilose, terminal leaflet up to 1.8 cm. long and wide, lateral leaflets mostly broadly elliptic, about 1 cm. long, 0.9 cm. wide; stipules 4–5 mm. long; stipels 1.5 mm. long; inflorescence laxly racemose, rachis finely canaliculate, uncinulate-puberulent; primary bracts early deciduous, up to 6 mm. long; secondary bracts present; pedicels glutinous spreading-pilose, 6–15 mm. long; calyx pilosulous and somewhat long-pilose along center of dorsal surface of teeth, teeth ciliate, with central tooth of lower lobe ovate-attenuate, 2–3 mm. long, lateral teeth acute, 1.5–2.5 mm. long, upper bifid lobe ca. 2 mm. long; standard ca. 1 cm. long, 0.8 cm. wide above, wings 8.5 mm. long, 3.5 mm. wide, keel-petals 9 mm. long, narrowed to a slender claw, ca. 2.5 mm. wide at truncate apex, loment stipitate, up to 6-articulate, stipe equaling or slightly longer than calyx, articles suborbicular with the reticulate surfaces uncinate-puberulent, ca. 4 mm. long and wide.

Huánuco: Ca. 3,200 meters, *Macbride 3210*. Suburb of Huánuco City, *Sawada P.118* (partly quinquefoliolate). Mito, *Macbride & Featherstone 1370*.—Junín: Uspachaca, ca. 2,800 meters, *Macbride & Featherstone 1311*.—Cuzco: Prov. Calca, Quebrada de San Salvador, 3,050 meters, *Vargas 122*. Prov. Paruro, dist. Callcha, Quetepampa, on the left side of the Río Apurímac, 2,820 meters, *Vargas* (U. of Cal. Exped.) *9731;* 2,850 meters, *Vargas 9731B*. Prov. Urubamba, Chicon Canyon, *Vargas* (U. of Cal. Exped.) *11064*.—

Ayacucho: Pampalca, between Huanta and Río Apurímac, ca. 3,200 meters, *Killip & Smith 22258*.—Indefinite: *Mathews 3264, p.p.* Mexico; Guatemala; Colombia; Venezuela.

Desmodium neo-mexicanum Gray in Smithson. Contr. to Knowledge, 3, art. 5: 53. 1852. (Pl. Wright. 1: 53); Schubert in Contr. Gray Herb. 129: 13, 6. map 5. *pl. 1, figs. C1–9.* 1940. *Meibomia neomexicana* (Gray) O. Ktze. Rev. Gen. 1: 198. 1891. *M. Nova-Mexicana* Vail in Bull. Torrey Club 19: 116. 1892. [as a correction for *M. neomexicana* (Gray) O. Ktze., which she quoted as "*M. Neo-Mexicana*"]. *D. Bigelovii* Gray, op. cit. 5, art. 6: 47. 1853 (Pl. Wright. 2: 47). *D. neo-mexicanum* Gray var. *Bigelovii* (Gray) Watson, Bibl. Ind. 217. 1878. *M. Bigelowii* (Gray) O. Ktze. op. cit. 197. *D. spirale* (Sw.) DC. var. *Bigelovii* (Gray) Robins. & Greenm. in Proc. Amer. Acad. 29: 385. 1894. *M. Hoehneana* Schindl. in Repert. Sp. Nov. 20: 151. 1924. *M. Lilloana* Schindl. op. cit. 152. *D. Lilloanum* (Schindl.) Burkart in Darwiniana, 3: 196. *fig. 11h* (p. 207). 1939. *M. spiralis* sensu Hoehne in Anex. Mem. Inst. Butantan Bot. 1: 50. 1921 as to specimen cited, *Lillo 4436*, not (Sw.) O. Ktze. *M. humilis* Schindl. loc. cit. *D. humile* (Schindl.) Burkart, op. cit. 198. *M. parva* Schindl. op. cit. 153. *D. parvum* (Schindl.) Standl. in Field Mus. Bot. 11: 160. 1936.

Herbaceous, much branched from base; branches grooved or subangulate, sparsely to densely uncinulate-puberulent; leaves chiefly trifoliolate, the lowermost unifoliolate; petioles 0.7–5.4 cm. long; leaf-rachis 0.15–1.2 cm. long; petiolules 0.6–1.8 mm. long; leaflets linear-lanceolate to ovate, rhombic- or more often lance-ovate, long-acuminate, obtuse and mucronulate at tip, cuneate to suborbicular at base, margins slightly revolute, ciliate, brightish green, glabriusculous to moderately strigose on upper surface, paler and sparsely to densely strigose below, often uncinulate-puberulent chiefly on midrib and veins of both surfaces, terminal leaflet 1.2–6 cm. long, 0.32–1.5 cm. broad, lateral leaflets 1.1–5.2 cm. long, 0.18–0.64 cm. broad; stipules 1.4–4.4 (6) mm. long; stipels 0.5–1.6 mm. long; inflorescence racemose-paniculate, rachis subangulate, rather densely uncinulate-puberulent; bracts persistent, becoming reflexed at maturity of loment; secondary bracts (1.6) 2–3.6 (4.5) mm. long; pedicels uncinulate-puberulent (densely so in flower, less so in fruit), 0.72–1.25 (in fruit –2) cm. long; calyx moderately pilose and uncinulate-puberulent, upper lobe bifid, 1.2–1.8 mm. long, central tooth of lower lobe 1.4–1.8 mm. long, lateral teeth 1.4–1.5 mm. long;

standard 2.5 mm. long, 2 mm. broad, wings ca. 2.1 mm. long, keel-petals ca. 2.6 mm. long; loment (2) 4–5-articulate, sessile to substipitate (occasionally stipitate); articles rhomboidal, reticulate, densely pilose and uncinulate-hispidulous when young, becoming less so at maturity, 3–4 mm. long, 2.2–3 mm. wide, sutures slightly revolute to much folded, terminal article usually orbicular or suborbicular, 3.2–4 mm. long, 2.8–3.2 mm. wide (sometimes glabrous).

Huánuco: Ambo, ca. 3,200 meters, *Macbride 3189; 3245.*—Lima: San Bartolomé, 1,500 meters, *Weberbauer 5282.*—Cuzco: Prov. Paruro, isquierda Río Apurímac, 2,500 meters, *Vargas 891.* Prov. Calca, "Urco," 2,870 meters, *Vargas 1647.* Southwestern United States, south into Mexico and in regions of rather high altitude in Peru, Bolivia and Argentina.

Desmodium Perrottetii DC. Mém. Lég. 7: 324. 1825. *Meibomia distorta* (Aubl.) Schindl. var. *Perrottetii* (DC.) Schindl. in Repert. Sp. Nov. 22: 282. 1926, as to name.

Herbaceous annual; stem simple, terete to subangulate, striate, uncinulate-pubescent; leaves unifoliolate; petioles pubescent as is stem, 0.8–1.5 cm. long; petiolules patent-pilose up to 3 mm. long; stipules persistent, ca. 7 mm. long, 2 mm. wide at base; stipels ca. 4 mm. long; leaflets rounded-ovate, obtuse, mucronate, soft-appressed-pilose above, densely soft-pilose beneath and with prominently reticulate venation, up to 5.5 cm. long and 4 cm. wide; inflorescence racemose-paniculate; rachis uncinulate-puberulent; primary bracts up to 1.5 mm. long; secondary bracts very small, not long persistent; pedicels very short, puberulent, ca. 1.5 mm. long; calyx puberulent and somewhat spreading villous, central tooth of lower lobe ca. 2 mm. long, lateral teeth equaling central one, upper bifid lobe 1.5 mm. long; standard up to 4.5 mm. long and 3 mm. wide, wings ca. 5 mm. long, 2 mm. wide, keel-petals up to 5.5 mm. long; loment substipitate, 3–6-articulate, articles rhomboidal to rounded, puberulent, 2.5–3 mm. long.—F.M. Neg. 6958.

Cuzco: Prov. Convención, Echasate, 950 meters, *Vargas 1150.* French Guiana. "Maxmanillo."

Desmodium Poeppigianum (Schindl.) Macbr. in Field Mus. Bot. 8: 101. 1930. *Nephromeria Poeppigiana* Schindl. in Repert. Sp. Nov. 20: 283. 1924.

Vine; stem terete, uncinate-pubescent; petioles 2.5–4.5 cm. long; rachis 1.5–2.5 cm. long; petiolules 2.5–3 mm. long; leaflets mucronate,

ovate, rounded at base, acute, sparsely pilose above, rather densely and softly so below, terminal leaflet 7–10 cm. long, 4–6 cm. wide, lateral leaflets somewhat oblique, 4–7.5 cm. long, 2–4 cm. wide; stipules said to be broadly ovate, acuminate, ciliate and very early deciduous (none seen); stipels ca. 5 mm. long; inflorescence racemose, the axillary racemes each subtended by ovate-attenuate, striate, puberulent, ciliate, connate bracts, 3.5 mm. long; rachis striate, uncinate-pubescent, primary bracts subtending pairs of pedicels, striate, very early deciduous, the secondary strap-shaped bracts ciliate at apex, extremely early deciduous, 1.5 mm. long; pedicels uncinulate-puberulent, up to 8 mm. long; calyx puberulent, tube shallow, 1–1.5 mm. long, central tooth of lower lobe 3 mm. long, lateral teeth 2 mm. long, upper lobe bifid, 3.5 mm. long; corolla white, standard 6.5 mm. long, 6 mm. wide, wings 5 mm. long, keel-petals equaling wings in length, fused almost the whole length and forming a T with dilated arms; loment stipitate, 1–2 (3?) -articulate, stipe ca. 3 mm. long, articles membranaceous, reticulate, suborbicular, with a very shallow angle formed by the dorsal suture of each article, isthmus joining articles up to 2 mm. wide, articles up to 2.2 cm. long and 2.4 cm. wide, ciliate on sutures, surfaces essentially glabrous.—F.M. Neg. 2919.

Forests. Loreto: Mishuyacu, near Iquitos, 100 meters, *Klug 281; 1465; Killip & Smith 27060.* Pebas on the Amazon River, *Williams 1789.*—San Martín: Tocache, *Poeppig 1896.*—Huánuco: Pozuzo, ca. 650 meters, *Macbride 4649.* Endemic.

Desmodium sclerophyllum Benth. in Mart. Fl. Bras. 15, pt. 1: 102. 1859. *Meibomia sclerophylla* (Benth.) O. Ktze. Rev. Gen. 1: 198. 1891.

Herbaceous; stem simple, erect, finely striate, uncinulate-puberulent; leaves unifoliolate, essentially sessile, leaflets lanceolate, narrowed to an acutish apex, rounded at base, dull and puberulous above, prominently reticulate and soft-puberulent beneath, 4–9.5 cm. long, 1.5–2 cm. broad; petiolule ca. 2 mm. long, equaling petiole, both densely short-spreading-pubescent; stipules apparently early deciduous; inflorescence racemose-paniculate, rachis uncinulate-pubescent; primary bracts up to 3.5 mm. long, secondary bracts smaller; pedicels uncinulate-puberulent, up to 3 mm. long; calyx spreading-pilose and puberulent, teeth ciliolate, central tooth of lower lobe 3.5 mm. long, lateral teeth 3 mm. long, bifid lobe 2.5 mm. long; standard 5–6 mm. long, 3–4 mm. broad, wings suboblong,

5–5.5 mm. long, ca. 1.75–2 mm. broad, keel-petals truncate at apex, 5–6 mm. long, 1.75–2 mm. wide; loment multiarticulate, articles almost orbicular, very short-pubescent, ca. 3 mm. long and 2 mm. wide.—F.M. Neg. 32127.

Loreto: Tarapoto, *Ule 6536*.—San Martín: Alto Río Huallaga, 360–900 meters, *Williams 6520*. British Guiana; Brazil.

Desmodium scorpiurus (Sw.) Desv. Journ. Bot. 1: 122. 1813; DC. Prodr. 2: 333. 1825. *Hedysarum scorpiurus* Sw. Prodr. 107. 1788. *Meibomia scorpiurus* (Sw.) O. Ktze. Rev. Gen. 1: 198. 1891. *Nissoloides cylindrica* M. E. Jones, Contr. West. Bot. 18: 135. 1935.

Subshrubby, prostrate or scandent to ascending; stem terete to angled, uncinulate-pilosulous; petioles 0.8–1.2 cm. long, rachis up to 0.3 cm. long; petiolules ca. 1 mm. long; leaflets mostly narrowly to broadly elliptic, obtuse, appressed-pilose above and below with midrib and chief lateral veins prominent on lower surface, terminal leaflet 1.1–2 cm. long, 0.5–1 cm. wide, lateral leaflets 1–1.5 cm. long, 0.4–0.7 cm. wide; stipules 3–4.5 mm. long; stipels 1–2 mm. long; inflorescence racemose, rachis very finely striate, puberulent; primary bracts up to ca. 4 mm. long, secondary bracts ca. 2 mm. long; pedicels puberulent, up to ca. 7 mm. long; calyx spreading-pilose with central tooth of lower lobe 2 mm. long, lateral teeth 1.75 mm. long, upper lobe bifid, 2 mm. long; standard 3.5 mm. long, 1.25 mm. wide, wings equaling standard, keel-petals 4 mm. long, 1.5 mm. wide; loment short-stipitate, usually 5-articulate, articles mostly oblong, scarcely if at all narrowed at isthmus, reticulate, uncinulate-pubescent, up to about 5 mm. long, 1.5 mm. wide.

Loreto: Puerto Arturo, lower Río Huallaga below Yurimaguas, ca. 135 meters, *Killip & Smith 27930 p.p.* Lower Río Huallaga, 155–210 meters, *Williams 5038*.—La Libertad: Prov. Trujillo, on sand flat between Trujillo and Salaverry, 5 meters, *Eyerdam* (U. of Cal. Exped.) *9053*.—San Martín: Prope Tarapoto, *Spruce 4113*.—Lima: Rimac, juxta Lima, *Ball*.—Junín: La Merced, ca. 650 meters, *Macbride 5226*. Mexico; Central America; West Indies; South America south to Peru.

Desmodium subsericeum Malme in Ark. Bot. 18, no. 7: 4. *pl. 1, fig. 1*. 1922. *Meibomia subsericea* (Malme) Schindl. in Repert. Sp. Nov. 20: 145. 1922.

Suffrutescent, up to 2.5 meters high; stem scandent to erect, deeply trisulcate, uncinulate-pubescent and somewhat appressed

pilose; petioles ca. 3–4 cm. long, rachis 0.7–1.1 cm. long; petiolules densely spreading-pilose, ca. 3 mm. long; leaflets thin, bright to dark-green, moderately appressed-pilose with short stiff hairs above, paler beneath and densely soft-appressed-pilose with the midrib and chief lateral veins prominent, terminal leaflet ovate, acute to obtuse, mucronate, rounded at base, 5–7 cm. long, 4–5.5 cm. wide, lateral leaflets similar, a little oblique, only slightly smaller; stipules ca. 4 mm. long, 2 mm. wide at base, very early deciduous; stipels up to 4 mm. long; inflorescence racemose, racemes terminal or axillary, rachis shallowly canaliculate, uncinulate-pubescent; primary bracts 6.5 mm. long, 2.5 mm. wide; no secondary bracts seen; pedicels slender, uncinulate-puberulent, 6–9 mm. long; calyx minutely puberulent, somewhat pilose along central tooth of lower lobe or more or less pilose throughout, central tooth of lower lobe 3.5–5 mm. long, lateral teeth 3–4 mm. long, upper bifid lobe 2–3 mm. long; standard 5.5–11 mm. long, 5–8 mm. wide, wings 6–10 mm. long, 2–3 mm. wide, keel-petals 6–8 mm. long, 2–2.5 mm. wide; loment 6-articulate, sessile to stipitate, articles chiefly semiorbicular, uncinulate-puberulent ca. 4 mm. long and 3 mm. wide.

Huánuco: Pozuzo, ca. 650 meters, *Macbride 4555.*—Junín: La Merced, ca. 700 meters, *Killip & Smith 23459.* Chanchamayo Valley, 1,200 meters, *Schunke 261; 1742.* Brazil.

Desmodium tortuosum (Sw.) DC. Prodr. 2: 332. 1825. *Hedysarum tortuosum* Sw. Prodr. 107. 1788. *Meibomia tortuosa* (Sw.) O. Ktze. Rev. Gen. 1: 198. 1891. *Hedysarum purpureum* Mill. Gard. Dict. ed. 8. no. 6. 1768. *M. purpurea* (Mill.) Vail apud Small, Fl. Se. U. S. 639. 1903. *D. purpureum* (Mill.) Fawcett & Rendle, Fl. Jam. 4: 36. 1920, not Hook. & Arn. Bot. Beechey Voy. 62. 1832.

Herbaceous, stem usually branched from the base, subangulate, finely striate, moderately uncinulate-pubescent; leaves frequently unifoliolate at base, always trifoliolate above; petioles 1–2.5 cm. long; rachis 0.5–0.8 cm. long; petiolules 1–1.5 mm. long; stipules not very long-persistent, 1 cm. long, up to 4 mm. wide at base; stipels up to 3.5 mm. long; leaflets elliptic to rhombic-ovate, obtuse, mucronate, reticulation between the chief lateral veins prominent, particularly on the lower surface, both surfaces puberulent to soft-appressed-pilose, margins ciliate, terminal leaflet 3.5–5 cm. long, 1.5–3.3 cm. wide, lateral leaflets 1.5–2.5 cm. long, 1–1.5 cm. wide; inflorescence racemose-paniculate, racemes axillary and terminal,

rachis lineate, glandular-pilose; primary bracts ca. 5 mm. long; secondary bracts much smaller, both types early deciduous; pedicels moderately spreading-glandular-pilose, 1–1.7 cm. long; calyx puberulent and with stiff long trichomes on teeth of both lobes, central tooth of lower lobe 2.5 mm. long, lateral teeth a little shorter, upper bifid lobe 2 mm. long; standard obovate, 4 mm. long, 3 mm. wide above, wings ca. 4 mm. long, up to 1.5 mm. wide, keel-petals falcate, 4.5 mm. long; loment 4–6-articulate, sessile, articles chiefly rhomboidal with margins alternately involute and revolute, terminal articles often more nearly orbicular, uncinulate-puberulent throughout, ca. 3.5 mm. long and 3 mm. wide.

Junín: La Merced, ca. 650 meters, *Macbride 5313*.—Cuzco: Quillabamba, *Soukup 186*. Prov. Convençión, hacienda Sahuayaco, 830 meters, *Vargas 1672*. In the United States in Florida; southern Mexico and Central America; the West Indies to Grenada; northern South America. "Kubi-sulluchi."

Desmodium uncinatum (Jacq.) DC. Prodr. 2: 331. 1825. *Hedysarum uncinatum* Jacq. Hort. Schoenbr. 3: 27. *pl. 298*. 1798. *Meibomia uncinata* (Jacq.) O. Ktze. Rev. Gen. 1: 197. 1891.

Herbaceous, ascending to erect; stem branched, densely uncinate-pubescent with stout trichomes; petioles 2–5.5 cm. long; rachis 0.5–1.2 cm. long; petiolules 2–2.5 mm. long; leaflets nearly orbicular to rounded-ovate, acute to obtusish at apex, mucronate, rounded to subcordate at base, lateral leaflets only slightly if at all smaller than terminal, upper surface glandular pilose (and also uncinulate-puberulent) with a shining mostly glabrous portion adjoining the midrib, lower surface also glandular-pilose, margins ciliate, 3.5–5.5 cm. long, 1.7–2.5 cm. broad; stipules 0.8–1 cm. long; stipels 2–6 mm. long; inflorescence racemose, racemes axillary and terminal; rachis uncinulate-puberulent to -pubescent and sparsely to densely patent-pilose; primary bracts 4.5–8 mm. long; secondary bracts up to 4.5 mm. long; pedicels glandular-hispid, 0.6–1 cm. long; calyx puberulent and hispid, central tooth of lower lobe 5 mm. long, lateral teeth 3–4 mm. long, bifid lobe ca. 4 mm. long; standard 1 cm. long, 0.9 cm. wide, wings 1 cm. long, 0.3 cm. wide, keel-petals 1.1 cm. long and 0.4 cm. wide; loment stipitate, up to 7-articulate, articles semirhomboidal, densely uncinate-pubescent, ca. 5 mm. long and 3 mm. wide.—*D. intortum*, *D. limense*, *D. Aparines* and *D. uncinatum* have been hopelessly confused. Schindler's treatment which distinguishes several species on the basis of geographical range is of

little help, since it does not take into consideration taxonomic characters. Critical study of the type specimens is the only way in which the problem can be solved.

Amazonas: Chachapoyas, *Mathews, s.n.*—San Martín: San Roque, 1,350–1,500 meters, *Williams 7140; 7490.*—Huánuco: Ambo, ca. 2,500 meters, *Macbride 3191.* Muña, ca. 2,500 meters, *Macbride 3998.*—Junín: Cabello, hacienda nine miles above Huertas, ca. 2,600 meters, *Macbride 1331.*—Cuzco: Yucay, *Soukup 767.*—Indefinite: *Maclean, s.n.* Northern Argentina and Brazil to the northern boundary of Bahia, west to the east slopes of the Andes, the highlands of Venezuela (according to Schindler).

Desmodium Vargasianum var. **arcuatum** Schubert, var. nov., frutescens; ramis sparse pilosis et uncinulato-puberulentibus; foliolis ovatis, obtusis, non prominenter mucronatis, pilosis utrinque; bracteis ca. 1 cm. longis, attenuatis supra mediam; lomentis immaturis arcuam 90° formantibus, 8-articulatis, articulis, late- vel semi-ellipticis vel orbiculatis, ad 5 mm. longis, 3 (4) mm. latis.—*Pennell 13998* with elliptic, prominently mucronate leaflets and small bracts, and the immature loments essentially straight seems to be transitional between varieties *bracteatum* and *curvatum*, but the material is inadequate for definite determination at present. The relationship, however, is distinct.

La Libertad: Chicama Valley, *E. Graywood Smyth 5.*—Lima: Chosica, ca. 1,000 meters, *Macbride 2859* (type in Herb. Field Mus.). —Huancavelica: Prov. Castro-Virreyna, western slopes of the Andes above Pisco, Pámpano, *Weberbauer 5388.*

Desmodium Vargasianum var. **bracteatum** Schubert, var. nov., semi-erecta; ramis puberulentibus; foliolis ellipticis, mucronatis, pilosis subtus, puberulentibus supra; bracteis magnis, ad 1.5 mm. longis, attenuatis tertia parte superiore; lomentis ad 8-articulatis, articulis parvis, ca. 5 mm. longis et 3 (4) mm. latis, uncinulato-puberulentibus.

Slopes. Huánuco: Huacachi (estacion near Muña), ca. 3,250 meters, *Macbride 4150* (type in Herb. Field Mus.).—Junín: San Rafael, ca. 2,800 meters, *Macbride 3132.*

Desmodium Vargasianum var. **ellipticum** Schubert, var. nov., herbacea; ramis subprostratis, glabrescentibus vel sparse uncinulato-pilosulis; foliolis ellipticis, obtusis, mucronatis, pilosis utrinque, densius subtus, foliolis terminalibus ad 3.2 cm. longis et 1.7 cm.

latis, foliolis lateralibus ad 2.7 cm. longis et 1.5 cm. latis; lomentibus eis varietatis *typicae* similibus.

Open hillside. Junín: Carpapata, above Huacapistana, ca. 2,400 meters, *Killip & Smith 24351* (type in Herb. Field Mus.).

Desmodium Vargasianum Schubert var. **typicum**. *D. Vargasianum* Schubert in Contr. Gray Herb. 124: 11. *pl. 1, figs. 1–5*. 1939.

Subscandent, with white pubescence except on inflorescence; stem simple, striate, densely canescent; petioles 1.2–2.8 cm. long; rachis 0.3–1 cm. long; petiolules 0.2–0.4 cm. long; the mucronate, subcoriaceous leaflets puberulent, dark green above, paler and densely hirsute with prominent venation beneath, the elliptic-ovate to oblong terminal leaflet 2.5–7.3 cm. long, 0.6–4.6 cm. broad, the oblong-ovate lateral leaflets 2–6 cm. long, 2.7 cm. broad; stipules with subclasping base, 0.6–1.2 cm. long; stipels 0.4–0.8 cm. long; inflorescence with fulvous pubescence throughout, its simple raceme terminal and subdense; the finely angled rachis uncinate-hispidulous; primary bracts up to 1 cm. long; secondary bracts not always present; pedicels sparsely pubescent, 0.6–1.4 cm. long; flowers large, up to 1.3 cm. long, calyx long-pilose, tube ca. 2 mm. long, central tooth of lower lobe 3–5 mm. long, lateral teeth 3–4 mm. long, upper lobe bifid, 3 mm. long; corolla blue, standard up to 1.4 cm. long, wings up to 1.35 cm. long, keel-petals equaling wings; loment stipitate, 4–7-articulate, stipe 3–5 mm. long, articles uncinate-hispidulous with lower suture subrhombic and more deeply constricted than the upper, up to 7 mm. long, 3–4 mm. broad.

Open or wooded hillsides. Cuzco: Prov. Quispicanchi, Marcapata Valley near Chilechile, *Weberbauer 7859* (atypical). Machu-picchu, 2,400 meters, *Vargas 804; Herrera 1984*. Urubamba, junto al camino, 2,000–2,500 meters, *Vargas 1866*.—Ayacucho: Pampalca, 3,200 meters, *Killip & Smith 22265*. Ccarrapa, 1,500 meters, *Killip & Smith 22415*.—Apurímac: Prov. Abancay, 2,400 meters, *Vargas 769* (type in Gray Herb.). Below Yanama, Ccollpa Valley, *Bingham 2064*. Endemic.

Desmodium Weberbaueri (Schindl.) Macbr. in Field Mus. Bot. 8: 102. 1930. *Meibomia Weberbaueri* Schindl. in Repert. Sp. Nov. 22: 275. 1926.

Herbaceous (to frutescent?), pubescence fulvous throughout; stem striate, patent-pilose with soft hairs; petioles 2–5.5 cm. long; rachis 1–2 cm. long; petiolules 3–4 mm. long; stipules ca. 1.3 cm.

long; stipels 3.5–8 mm. long; leaflets ovate, mucronate, obtuse at apex, obtuse to rhombic at base, upper surface yellow-green, moderately appressed-pilose with fine long (1 mm.) but inconspicuous trichomes, lower surface paler, more densely appressed-pilose, particularly on midrib and veins, terminal leaflets 9–11 cm. long, 4–5.5 cm. wide, lateral leaflets 6–9 cm. long; inflorescence simple, racemose, rachis sparsely pilose and uncinulate-puberulent, pubescence more slender than on other parts of plant; primary bracts early deciduous, ca. 1.3 cm. long and 0.3 cm. wide; secondary bracts up to ca. 0.6 cm. long, 0.5 mm. wide; pedicels puberulent, 12–13 mm. long; calyx moderately hirsute on teeth, margins ciliate, tube ca. 2.5 mm. long, teeth ovate, acuminate, central tooth of lower lobe 3.5 mm. long, excluding tube, lateral lobes 3 mm. long, upper lobe bifid, 3.5 mm. long; standard suborbicular, slightly clawed, 1.1 cm. long, 7.5 mm. wide, wings 1.05 cm. long, obtuse, short-clawed, keel-petals ca. 1 cm. long; loment 5–7-articulate, articles suborbicular, densely uncinate-pubescent when young, ca. 4 mm. long and wide (immature).—F.M. Neg. 20901.

Cuzco: "Pillahuata," Cerro de Cusilluyoc, 2,300–2,600 meters, *Pennell 13954, 14020.* Peru (and Ecuador according to Schindler).

Desmodium Wydlerianum Urb. Symb. Ant. 2: 302. 1900; Schubert in Contr. Gray Herb. 129: 21. *pl. 2, figs. 1–7.* 1940. *Meibomia Wydleriana* Britton, Sci. Surv. Porto Rico & Virgin Isl. 5: 403. 1924.

Shrubby, stem prostrate to ascending, rooting at nodes, striate, uncinulate-puberulent; petioles 4–5 mm. long, rachis 1–1.3 cm. long; petiolules ca. 1 mm. long; stipules up to ca. 5.5 cm. long, early deciduous, none seen on Peruvian specimens; stipels subulate, extremely short; leaflets ovate, acuminate, mucronate, very pale and appressed-pubescent beneath, darker and moderately so above, mostly truncate at base and with undulate margins, terminal leaflets 4.5–9 cm. long, 4–5.5 cm. wide, lateral leaflets 3.5–7 cm. long, 2.5–4 cm. wide; inflorescence axillary, racemose, rachis striate and puberulent; primary bracts ca. 1.5 mm. long; secondary bracts smaller, 2 subtending each pedicel, all quite early deciduous; pedicels slender, striate, uncinulate-puberulent, up to ca. 2 cm. long; calyx with central tooth of lower lobe 3.5 mm. long, lateral teeth 3 mm. long, upper bifid lobe 3 mm. long, corolla with standard 4.5 mm. long, 4 mm. wide, the suboblong wings 4.5 mm. long, 2 mm. wide, keel-petals 5 mm. long and 2 mm. wide; loment stipitate, usually 2-artic-

ulate, stipe ca. 2 mm. long, articles uncinate-pubescent with the dorsal suture slightly invaginated and the ventral suture rounded, 8–10 mm. long, 4.5 mm. wide.

San Martín: Prope Tarapoto, *Spruce 4212*. Costa Rica; Hispaniola; Puerto Rico; Lesser Antilles; Venezuela.

61. AMICIA HBK.

Reference: Burkart, in Darwiniana 3: 170–175. 1939.

More or less villous-stemmed, sometimes somewhat glandular, slender shrubs often with sprawling or divaricate branches, the abruptly pinnate leaves usually with 2 pairs of obovate or obcordate, estipellate leaflets. Calyx deeply lobed, the 2 upper lobes as long as or longer than the campanulate tube, the lateral small, the lowest narrow and shorter than the upper. Banner clawed, emarginate, erect-spreading. Stamens 10, all connate in a sheath cleft on the upper side, the uniform anthers in 2 rows. Pods laterally compressed with 2–several indehiscent segments.

Besides the following, there are three closely related species, *A. micrantha* Harms, *A. medicaginea* Griseb., *A. fimbriata* Harms, in Bolivia that may be expected in the mountains of southern Peru; they are all characterized by their small flowers, 5–15 mm. long, those of *A. micrantha* subsessile, the racemes thus glomerulate, those of the other species well pedicellate; *A. medicaginea* has the leaflets definitely emarginate, in *A. fimbriata* they are rounded at the apex.

Flowers yellowish, 2–3 cm. long.....*A. glandulosa.*
Flowers greenish-red or purplish, 4–5 cm. long.....*A. Lobbiana.*

Amicia glandulosa HBK. Nov. Gen. & Sp. 6: 512. *pl. 600.* 1824.

Stems flexuous or semi-scandent, typically sparsely retrorsely strigillose becoming glabrate; leaflets subrotund, retuse, mostly about 2 cm. broad, slightly longer, glabrous except the pilose midnerve beneath; peduncles axillary, solitary, several-flowered, the filiform pedicels conspicuously bracted, the bracts orbicular to 6 mm. broad; calyces about 8 mm. long, glabrous, the teeth very unequal, the 2 upper ovate-orbiculate; flowers glabrous; pods oblong-linear, falcate, glabrous but glandular-dotted with about 5 segments.—*Weberbauer 6406*, without locality in Field Museum, varies in its densely rusty villous peduncles, petioles and upper stems, and the trichomes mostly spreading; it may become var.

villosa Macbr., var. nov., caulibus petiolis pedunculisque dense cum pilis fulvis patentibus villosis. F.M. Neg. 2141.

Piura: Cuesta de Frías, *Raimondi.*—Cajamarca: Montañas de Nanchoc, *Raimondi.*—Lambayeque: Above Olmos, 1,800 meters, *Weberbauer 7108* (det. Harms); *6406.* Ecuador; Colombia.

Amicia Lobbiana Benth. ex Rusby, Mem. Torrey Club 3, no. 3: 20. 1893.

Similar in habit and foliage to the preceding, but pubescent like the variety, and the leaflets more obcordate, more deeply retuse; bracts mostly unequally reniform; flowers oblong-falcate, appressed pilose, the broad, lateral calyx lobes about half as long as the purplish corolla.

Huánuco: Above Panao, slender-stemmed shrub of sunny stream thicket, 2 meters high, *3577.* Muña, *Raimondi.*—Junín: Río Masamerich (Río Pangoa), 2,400 meters, *Weberbauer 6670;* 246.—Carpapata, *Killip & Smith 24452.*—Cuzco: Pillahuata, open grassy slope, 2,400 meters, *Pennell 14029.* Near Achirani, Prov. Paucartambo, 2,700 meters, *Vargas 11159.*—Puno: Limbani, Prov. Sandía, among rocks, 3,250 meters, *Vargas 9656; 1296; Weberbauer 559* (det. Harms); 238. Bolivia.

62. AESCHYNOMENE L.

Erect prostrate or diffuse herbs or shrubs with pinnate leaves, the leaves sometimes without a terminal leaflet, the leaflets many. Stipules often conspicuous. Flowers commonly yellow often purple-striate, usually in axillary racemes. Bracts ordinarily stipule-like, the bracteoles appressed, the lobes of the latter often more or less connate into two lips. Banner suborbicular, shortly clawed. Stamens 10, united, the sheath cleft on one or both sides. Pod stiped with 2–many usually indehiscent square or semicircular segments.—The leaves, at least of many species, collapse when irritated.—In compiling this synopsis, I have drawn largely on Bentham in Mart. Fl. Bras. 15, pt. 1: 56–70. 1859, and Burkart, Darwiniana 3: 144–158. 1939. *Soemmeringia semperflorens* Mart., 70, of muddy shores in Brazil, is a low herb strikingly distinguished by the scarious reticulate veiny banner which conspicuously overlaps the other petals.

Stipules prolonged at base; stamineal tube biparted.

Pods black at maturity, usually smooth; plants glabrous or glandular scabrous.....*A. sensitiva.*

Pods brown, pubescent or at maturity verruculose; plants often more or less hispid.....*A. indica.*

Stipules not extended at base.

Low diffuse plants; stamineal tube parted only on one side.

Stipes of pods shorter than or little exceeding calyx.

Racemes longer than the leaves.....*A. biflora.*

Racemes crowded, short.....*A. hystrix.*

Stipes of pods well exserted from the calyx.....*A. falcata.*

Shrubs, often erect; stamineal tube usually biparted.

Ovules 2–4, the pods with as many segments.

Pods mostly with 3–4 segments, pilose; leaves and branchlets with spreading pubescence.....*A. Weberbaueri.*

Pods with 2–3 segments; pubescence at least of leaves subappressed.

Pubescence of peduncles closely appressed; pods puberulent.....*A. scoparia.*

Pubescence of peduncles spreading; pods glabrous.
A. platycarpa.

Ovules several, the pods usually with several segments.
A. mollicula.

Aeschynomene biflora (Mill.) Fawcett & Rendle, Fl. Jam. 4, pt. 2: 27. 1920. *Cassia biflora* Mill. Gard. Dict. ed. 8. 1768. *Hedysarum brasilianum* Poir. in Lam. Encycl. 6: 448. 1804. *A. brasiliana* (Poir.) DC. Prodr. 2: 322. 1825.

Branching, shrubby or semiherbaceous, viscid, hirsute, the trichomes widely spreading; stipules ovate, acuminate, 3–4 mm. long; leaves 2–3 cm. long with 5–8 pairs of broadly elliptic or somewhat obovate thin leaflets, rounded or minutely mucronulate, glabrous above, sparsely appressed pubescent, reticulate-veined beneath; racemes 3 cm. long or longer, the flowers about 5 mm. long on spreading pedicels as long; calyx 5-toothed, the 2 upper teeth obtuse, the 3 unequal lower somewhat acute; pod reflexed, the lower suture deeply crenate with 2–3 roundish lightly pubescent segments.—F.M. Neg. 6959.

Junín: Sandy trail border, La Merced, *5483*.—Cuzco: In Patio de Illapaní, *Bues* (det. Standl.). South America to Central America and the West Indies.

Aeschynomene falcata (Poir.) DC. Prodr. 2: 322. 1825. *Hedysarum falcatum* Poir. in Lam. Encycl. 6: 448. 1804.

Prostrate or diffuse, similar to *A. biflora*, but more closely pubescent, viscid; leaflets 6–10 mm. long, sometimes densely pubescent; pods often falcate with as many as 8 puberulent segments, the filiform stipe 4–12 mm. long.—Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 14*.

San Martín: Tarapoto, *Spruce 486*. Patagonia to Mexico.

Aeschynomene hystrix Poir. in Lam. Encycl. Suppl. 4: 77. 1816.

Diffuse annual or perennial with the general character of *A. falcata*, but with 8–15 pairs of oblong leaflets and crowded racemes, these shorter than the leaves; stipules lanceolate, subulate-acuminate; pedicels 4–6 mm. long; pod commonly glabrous with only 2 segments, scarcely 3 mm. long, the stipes slightly shorter than the calyx.—Illustrated, Mart. Fl. Bras. 15, pt. 1. *pl. 15*.

San Martín: Tarapoto, *Williams 5846*. Warm South America to Central America.

Aeschynomene indica L. Sp. Pl. 1061. 1753.

Slender-stemmed, often becoming more or less woody below, glabrous except above where minutely and sparsely spiculate-glandular and slightly pilose; leaves with 15–20 (50) linear, oblong or oblong-elliptic obtuse 1-nerved leaflets 4–7 mm. long, 1–2 mm. broad; flowers few, glabrous, 5–6 mm. long; stipe of pod well-exserted; pod straight or nearly, lightly crenate on the lower suture, with 6–10 segments, 4–5 mm. broad, these subquadrate, at first smooth, but at maturity, especially medially, verrucosely roughened.—*A. rudis* Benth. Pl. Hartw. 116. 1843 (*A. hispida* HBK. Nov. Gen. & Sp. 6: 531. 1824) and *A. virginica* (L.) BSP. Cat. N. Y. Pl. 13. 1888 (*A. hispida* Willd.) seem to be races or varieties; the former has pods more or less pubescent, 3.5 mm. wide, the stipe 7–10 mm. long; the latter has hirsute stems, larger flowers, the hispid pods 4.5–6 mm. broad on stipe 3–5 mm. long. The widely distributed *A. americana* L. Sp. Pl. 713. 1753, apparently not yet recorded from Peru, may be recognized by its narrow falcate leaflets that are usually 3-nerved, the midnerve marginal, and by the suborbicular pod-segments.

Piura: Nigritos, *Haught F.163*.—Lima: Near Lima, (*Cuming 1088*, det. Benth. as *A. rudis*). Warm areas.

Aeschynomene mollicula HBK. Nov. Gen. & Sp. 6: 532. 1824.

Branches elongate, yellowish sericeous; stipules lanceolate-subulate, 8–10 mm. long; leaves lightly appressed pilose both sides, with 18–20 pairs of oblong-linear leaflets, their bases somewhat cordate, mucronate, 4 mm. long, 3 mm. broad; flowers yellow, glabrous, 2 or 3 in the axils on pilose pedicels 6 mm. long; calyx teeth acuminate, the longer lower lanceolate-subulate twice exceeding the upper; stamineal tube biparted; stipe of pod slightly exceeding the pilose calyx; pod segments nearly distinct, hirsutulous, semicircular, 5 mm. broad, usually several (1–6).—A glabrous plant, the specimen seen meager, is apparently allied and perhaps distinct specifically, but may be recorded here only as variety **egena** Macbr., var. nov., ubique glabratis.—The racemes are better developed than in the type; the pods are immature. F.M. Neg. 2241.

Cajamarca: Between Paramo de Yamoca and Colasey, Prov. Jaén, *Bonpland*, type. Between Tabacoas and Marañón rivers, *Weberbauer 6176* (type, var. *egena*).

Aeschynomene platycarpa Benth. in Mart. Fl. Bras. 15, pt. 1: 63. 1859. *A. tumbezensis* Macbr. Field Mus. Bot. 8: 101. 1930.

Allied and similar to *A. scoparia*, but long-pubescent, the branches glabrate; leaves minutely pilose or glabrous above, the peduncles and pedicels hirsutulous, the trichomes spreading; leaflets linear-oblong to oblong-elliptic, in the Peruvian form often 15 mm. long, a third as broad; banner lightly pilose or glabrate, scarcely 1 cm. long, stamineal tube biparted or only anteriorly; keel rostrate; calyx about 4 mm. long, the upper teeth shorter or subequaling the tube; pod long-stipitate, the 2–3 nearly separate segments finally nearly 7 mm. broad.—It is possible that more than one entity is concerned here, but from the material at hand the species seems to be variable in character of calyx and probably in pubescence as suggested by Benth., l.c.; in the latter case *A. scoparia* should be broadened to include the following collections. F.M. Neg. 2153.

Tumbez: Hacienda Chicama, deciduous bushwood, *Weberbauer 7669* (type, *A. tumbezensis*). Between Corritos and Tumbez, *Weberbauer 7746*.—Piura: Caña Dulce watercourse, *Haught 177; F.87*. Colombia; Brazil.

Aeschynomene scoparia HBK. Nov. Gen. & Sp. 6: 531. 1824. *A. puberula* DC. Prodr. 2: 321. 1825(?).

Diffuse shrub with strict elongate, angulate ashy silky-pilose branches (especially above), peduncles and calyces; leaves shortly petioled with 10–14 pairs of oblong mucronulate rounded or minutely cordate at base 1-nerved leaflets more or less appressed pilose both sides, mostly 4 mm. long; stipules lanceolate-subulate, rigid, 6 mm. long; peduncles axillary, geminate, few-flowered, to 2.5 cm. long, the yellow flowers about 6 mm. long on filiform pedicels as long; bracts ovate, acute, striate-nerved, deciduous; calyx campanulate, membranous, reticulate-nervose, the teeth obtuse, the upper two broader than the concave lower; keel obtuse; petals clawed; stamineal tube parted on one side; pod shortly stiped, crenately lobed on the lower suture, with 3 membranous puberulent segments, these semiorbicular.—The author questioned the reference of the plant to this genus. *Weberbauer 5910* is sparsely glandular-hispidulous; cf. *A. platycarpa*. F.M. Negs. 2643; 6960 (*A. puberula*).

Piura: Huancabamba, *Bonpland*, type. Shumaya, 1,700 meters, *Weberbauer 6276*.—Apurímac: Near Abancay, 2,400 meters, *Vargas 458; Weberbauer 5910*.—Lima: Santa Eulalia Valley, *Goodspeed 11478* (det. Johnst.).

Aeschynomene sensitiva Sw. Prodr. 107. 1788.

Glabrous (or sparsely pubescent above) herb, or somewhat lignescent, 1–3 (5) meters high; stipules membranous, early deciduous, to 10 mm. long; leaves to 8 cm. long, with numerous pairs of linear-oblong rounded or obtuse and mucronate glabrous leaflets, mostly 5–8 mm. long, about 3 mm. wide; racemes 3–4-flowered, the shortly pediceled flowers 7 mm. long; calyx bilabiate, 3 mm. long, the rounded lips subentire; pod straight or nearly, lightly sinuate, the stipe exserted from the calyx, the subquadrate segments 4–5 mm. broad, glabrous or nearly.

Piura: Pariñas Valley, *Haught F.62; 158*.—Loreto: Near Iquitos, *Williams 1398; 7961; Klug 329*. Warm America and tropical Africa.

Aeschynomene Weberbaueri Ulbr. Bot. Jahrb. 37: 554. 1906.

Branches especially toward the tips densely pubescent, with short more or less spreading, ashy trichomes and long stiffer yellowish ones intermixed; stipules about 10 mm. long, 1.5 mm. broad at the unappendaged base; leaves 2–3 cm. long, pilose-hirsutulous with 12–15 pairs of crowded oblong linear sessile leaflets 4–7 mm. long, 1–1.5 mm. broad, the stiffer marginal trichomes somewhat glandular;

racemes 3–5 cm. long, with about 5 orange-brown flowers, these 10–12 mm. long on somewhat shorter pedicels; calyx pilose, 4–5 mm. long, bilabiate, the lobes fimbriate, the upper 2.5 mm. long, the lower lanceolate, 3.5 mm. long; keel narrowed to tip; stamineal tube biparted; pod long-stipitate, appressed pilose, the 3–4 semi-orbicular segments 4 mm. broad.—F.M. Neg. 2156.

Amazonas: Prov. Chachapoyas, grass steppes with scattered shrubs, 2,000 meters, *Weberbauer 4274;* 190. Ecuador.

63. **RAIMONDIANTHUS** Harms

Probably sprawling, with imparipinnate leaves exceeded by the axillary and terminal sparsely branched panicles of rather conspicuous flowers. Calyx obliquely cupulate-infundibuliform, nearly straight, attenuate at base, shortly toothed, the upper teeth little connate. Petals subequal, the banner broadly obovate, nearly truncate at the short claw; keel petals slightly curved. Stamens 10, the tube sometimes cleft both sides, the vexillar stamen connate medially with the others. Ovary velutinous, the ovules 6–8; style glabrous above, the stigma minute. Pods sessile, oblong, acute both ends, straight or nearly, plane, chartaceous, with numerous obliquely longitudinal veins that form a reticulation as they converge toward the middle; seeds 6 in one row, the tissue on each side attenuated.—Allied by the author to *Isodesmia* Gardner of Brazil with linear pods of different character. The pods are not mature; held against light they seem to be nearly wing-margined on each side of the row of seeds.

Genus dedicated to Antonio Raimondi, great naturalist of Peru, professor at the University of Lima; cf. Weberbauer, 13–14.

Raimondianthus platycarpus Harms, Notizbl. Bot. Gart. Berlin 10: 387. 1928.

Upper stems, rachis of the leaves, leaflets beneath and panicles even to the calyces more or less densely rusty villous or finely pilose; leaflets opposite, 5–7, shortly petiolulate, oblong-elliptic or slightly ovate, rounded at base, obtuse to acute, 1.5–6 cm. long, 1–3.5 cm. wide; stipules lanceolate; panicles open; bracts deltoid, 2–2.5 mm. long; pedicels slender, 7–13 mm. long, the geminate bractlets deciduous; calyx 7–8 mm. long, the teeth about 1.5 mm. long; banner pubescent without, about 22 mm. long, 13 mm. wide, the other petals about 16 mm. long, 5 mm. wide; pods puberulent or

glabrate, 7–7.5 cm. long, nearly 2 cm. wide.—Type collected in Sept., 1878. F.M. Neg. 2138.

Cajamarca: Tambillo, Prov. Cutervo, *Raimondi 3514* and three other sheets, type; *Jelski 216*.

64. CHAETOCALYX DC.

Climbing herbs with imparipinnate leaves, the estipellate leaflets often few, the stipules lanceolate or linear, the axillary inflorescence of yellow flowers sometimes reduced, in any case shorter than the leaves. Calyx divisions subequal or the upper two approximate, the calyx pubescence in part rather rigid and tubercled at base. Banner broad, emarginate, the wings oblong, the scarcely shorter keel obtuse. Stamens connate or the vexillar finally free, the anthers uniform. Pod linear, subterete or plano-compressed, scarcely constricted between the seeds, the linear, oblong or quadrate segments longitudinally costate or striate.

Besides the following, **C. latisiliqua** (Desv.) Macbr., comb. nov., *Planarium latisiliquum* Desv. Ann. Sci. Nat. sér. 1. 9: 416. 1826, may occur, having been found as near as Ecuador where known as chupa-chupa, and was attributed to Peru by Bentham & Hooker; it is esetulose with oblong pods, the quadrate segments 1 cm. broad, half as long. This species was described and illustrated by Bentham, Bot. Voy. Sulphur 81. *pl. 30*, as *Planarium* and the Index Kewensis erred in accrediting the above transfer to him; since the Index should properly be regarded purely as bibliographical work, the perpetuation of its errors will result in confusion or serve no useful purpose.

Leaflets usually 7–10; pods esetulose, the calyx tuberculate-setose. *C. brasiliensis.*

Leaflets 5; calyx as well as pods merely puberulent. *C. Weberbaueri.*

Chaetocalyx brasiliensis (Vog.) Benth. ex Mart. Fl. Bras. 15, pt. 1: 75. *pl. 18*. 1859. *Rhadinocarpus brasiliensis* Vog. Linnaea 12: 110. 1838.

Glabrous or nearly except for the scattered setae on the slender stems and calyx or sometimes also lightly strigillose-pilose; leaflets oblong-elliptic or oboval, broadly rounded or truncate and minutely mucronulate, commonly about 2 cm. long, 1.5 cm. broad; pedicels to 1.5 cm. long; calyx 1 cm. long, oblong-cylindric; the flowers about twice as long; pods linear, straight or somewhat curved, to

10 (15) cm. long, the oblong, linear segments as many as 12–14. *C. hebecarpum* Benth., l.c. 76, seems to be very near but is perhaps more densely setulose, the leaflets apparently at least usually only 5. *Coronilla scandens* Vell., if an earlier name as suggested by Bentham, is preoccupied in the genus.

San Martín: In clearing, Juanjuí, *Klug 4361* (det. Standl.).—Junín: Río Pinedo, *Killip & Smith 23581*.—Loreto: Iquitos, *Killip & Smith 27336*. Without locality, *Ruiz & Pavón* (det. Harms).—Río Acre: *Ule 9452* (det. Harms). To Patagonia.

Chaetocalyx Weberbaueri Harms, Repert. Sp. Nov. 17: 132. 1921.

Stems moderately stout and conspicuously but rather weakly setose as well as minutely puberulent; leaflets oblong or obovate-oblong, glabrous or nearly, 3–7 cm. long, 1.5–4 cm. broad; bracts of the few-flowered racemes ovate, lanceolate, puberulent, 4–5 mm. long, the slender puberulent pedicels 6–12 mm. long; calyx broadly and obliquely cupulate, puberulent, 7–9 mm. long, the corolla 2.5 cm. long; young, linear pod pubescent.—Seems to be amply distinct from *C. brasiliensis* et rel. in its shorter campanulate calyx. F.M. Neg. 2137.

Piura: Palambla, in evergreen shrubs, 1,000 meters, *Weberbauer 6020*.

65. FIEBRIGIELLA Harms

Comparable to *Chaetocalyx* with which it could be united, but the racemes long-peduncled, far exceeding the leaves, and the fruit with only 1–4 segments, the lower suture indented.—Harms allied the genus to *Aeschynomene*, having found the stamen-sheath parted on both sides, but according to Burkart, Darwiniana 3: 167. 1939, the stamens are monadelphous, the tube cleft above as in *Chaetocalyx*. The latter author perhaps inadvertently has written "*Fiebrigella*."

Fiebrigiella gracilis Harms, Bot. Jahrb. 42: 95. 1909.

Prostrate or laxly ascending more or less hirsute-pilose herb; leaflets 2–3 pairs, oblong, obovate, obtuse to acute at base as at apex where obscurely mucronulate, membranous, glabrous above, lightly silky hirsute beneath, 1–3 cm. long, 5–15 mm. broad; peduncles 1–2 dm. long, the slender pedicels 5–10 mm. long; calyx cupulate, hirsute-pilose, about 6 mm. long, the teeth lanceolate, the upper connate, bifid; flowers 11–12 mm. long, orange marked with dark

violet; pods subsessile, undulate-crenate, oblong-linear, the 2–4 segments obliquely oblong or somewhat trapeziform.—F.M. Neg. 1222.

Piura: Ayavaca, *Weberbauer 6375*. Bolivia.

66. NISSOLIA Jacq.

Slender, twining and somewhat suffrutescent plant with imparipinnate leaves, the leaflets few, estipellate, the stipules setaceous. Flowers yellow, sometimes partly violet, reddish in age, borne in axillary clusters, racemes or thyrsoid at the tips of the branches. Bracts subulate, bractlets none. Calyx truncate with subequal setaceous teeth. Banner reflexing with short claw; keel obtuse. Stamen except the vexillar, connate in a closed sheath, the anthers subreniform. Ovary subsessile, few-ovuled, the filiform style with terminal stigma. Pod indehiscent, the ultimate of the 1 or 2 segments expanded into an obliquely obovate wing.

Nissolia fruticosa Jacq. Icon. Rar. 198. *pl. 179*. 1763.

Leaflets 5, ovate, usually obtuse but mucronulate, mostly 3 cm. long, more or less softly pubescent beneath; inflorescence various, the pedicels filiform, to 8 mm. long; calyx 2–3 mm. long, the teeth more or less developed; flowers 6–8 mm. long; pod segments oblong, scarcely distinct, the wing to 2.5 cm. long, 15 mm. broad.—Illustrated, Mart. Fl. Bras. 15, pt. 1: *pl. 19*.

Piura: Río Quiroz, *Raimondi*.—San Martín: Juanjuí, *Klug 4320*. —Junín: Río Mantará, 2,300 meters, *Weberbauer 6555*. La Merced, sandy valley, *5434*.—Loreto: Balsapuerto, *Klug 3114* (det. Standl.). —Cuzco: Prov. Convençión, 900 meters, *Stork, Horton & Vargas 10480*. South to Patagonia, north to Central America.

67. TRIFOLIUM L.

Cespitose or diffuse herbs, the leaves usually palmately 3-foliolate, the flowers capitate. Calyx and corolla persistent, the lobes of the former bristle-tipped, the petals of the latter united with the stamens, the uppermost of these free, the rest united into a sheath. Pod membranous, ordinarily included in the calyx, indehiscent.—Rarely a leaf, notably in *T. repens*, bears 4 leaflets, the finding of which in many parts of the world is regarded as a sign of good luck.

T. depauperatum Desv. of Chile was listed in Pflanzenfamilien as occurring in Peru, but probably this was an error; the heads are

minutely involucrate. The species known in Peru are all without involucre. Besides the following, *T. filiforme* L. var. *dubium* (Sibth.) Fiori, an annual with yellow flowers borne tightly in small heads, and the perennial *T. pratense* L., the red clover, flowers rarely white, not deflexed in fruit, may occur as adventive or as an escape from cultivation.

Flower heads subsessile.....*T. peruvianum.*

Flower heads well-peduncled.

Cespitosely tufted, the stems diffuse or even prostrate but not rooting; flowers pink to red.

Calyx teeth subequal; leaflets often shorter than 1.5 cm.; native species.....*T. amabile.*

Calyx teeth unequal; leaflets often 2–3 cm. long; introduced. *T. hybridum.*

Creeping plants, the stems rooting at the nodes; flowers often white.

Flowers white; calyx teeth not equaling the tube....*T. repens.*

Flowers roseate; calyx teeth longer than the tube..*T. concinnum.*

Trifolium amabile HBK. Nov. Gen. & Sp. 6: 503. *pl. 593.* 1824.

Cespitose, diffuse, procumbent, more or less villous with long trichomes especially above, including petioles, peduncles and calyces; petioles 10–14 mm. long; leaflets broadly obovate, apically rounded and minutely mucronate, denticulate, flabellately veined, membranous, glabrous; stipules adnate, 4–5 mm. long, acuminate mucronate; umbels equaling or exceeding the leaves, 8–14-flowered; flowers typically 5–6 mm. long; pedicels 2 mm. long, the subulate bracts longer or shorter; calyx 10-nerved, the acuminate subulate teeth longer than the tube, subequal; corolla glabrous, the obovate sessile banner scarcely twice longer than the calyx teeth; ovary subsessile, glabrous, with 2 ovules; pod obliquely rotund-elliptic, subrugulose, glabrous, except for the obscurely pilose mucronate tip, 1–2-seeded, the seeds subrotund, glabrous, opaque.—Description after HBK.; the type Mexican.

T. Matthewsii Gray, U. S. Expl. Exped. Bot. 1: 398. 1854, as to type, is laxly hirsute, but the retuse coarsely serrate leaflets in age glabrate or even glabrous above, stipules 8–10 mm. long, pedicels 3 mm. long, flowers 8–10 mm. long, the calyx sparsely villous; pod sparingly and minutely pubescent, 3-seeded. *T. macrorrhizum* Ulbr., Repert. Nov. Sp. 2: 2. 1906, is based on an old plant with long root,

stout caudex; flowers 7–8 mm. long, calyx teeth well exceeding tube, often glabrous; pod glabrous, 4-seeded. It seems to me that these plants represent forms better included as varieties of *T. amabile;* otherwise the latter must be restricted to Mexico and further forms designated as species. The plants from central Peru are mostly *T. Matthewsii;* those from the southern part of the country are more nearly typical.

When fasting, the Indians eat it mixed with a little white maize and a few herbs as "chucam" (Garcilazo). F.M. Neg. 2023 (*T. macrorrhizum*).

Piura: Bajada de Huancabamba, *Raimondi.*—Cajamarca: Cutero, Chorillos and Nanchoc, (*Raimondi*).—Ancash: Pampa-Romas, 3,100 meters, *Weberbauer 3213* (type *T. macrorrhizum*); 170.—Amazonas: Chachapoyas, (*Mathews* fide Gray).—Lima: Río Blanco, in firm sandy soil, flowers red, *821; Killip & Smith 21635.* Matucana, *354; 438;* (Weberbauer, 169). Open rocky slopes, petals pale rosolane purple, 2,700 meters, above Obrajillo, *Pennell 14375; Wilkes Exped.* (type, *T. Matthewsii*).—Huánuco: Mito, shrubby slope, flowers light pink, *1440.* Chinche, *1268.*—Junín: La Quinua, steep grassy slope, 3,500 meters, *2029* (matches type, *T. Matthewsii*).—Huancavelica: Near Pampas, in gravelly, poor soil, 3,250 meters, *Stork & Horton 10232* (*T. amabile*).—Apurímac: Ampay, 3,400 meters, *Vargas 767.* Paracuramba Pass, 4,000 meters, *West 375* (det. Johnst.).—Arequipa: Cachendo, 1,100 meters, (*Günther & Buchtien 275a,* det. Bruns). Atiquipa, *Raimondi.*—Cuzco: Valle del Apurímac, *Herrera 2399.* Valle del Paucartambo, (*Herrera 329*).—Puno: Near Puno, *Soukup 531;* Weberbauer, 186. Patagonia to Mexico. "Chicmu" (Vargas), "chijmu," "layu," "chchucan" (Herrera), "chucam."

Trifolium concinnum Philippi, Fl. Atac. 14. 1860.

Stems creeping, subvillous; petioles 5–10 cm. long, the obcordate serrulate leaflets 10–18 mm. long; stipules scarious; peduncles somewhat shorter than or little exceeding the leaves, villous; flowers purple, to 12 mm. long, about 18 in each umbel; pedicels nearly 3 mm. long, the herbaceous subulate bracts scarcely as long; calyx teeth 3-nerved, lanceolate, aristate, nearly equaling the tube; pods with 4–6 seeds.—As Johnston remarks, Contr. Gray Herb. 85: 50. 1920, the species belongs to a group of closely allied forms and the Peruvian plants may be no more than a variety of *T. megalanthum* Steud. typically with larger flowers, more deeply lobed calyx, but

according to him it has a "detached natural range." His specimens bear cleistogamic flowers at the root-bearing nodes of the creeping stems. It has been reported from Mollendo as *T. polymorphum* Poir. and *T. grandiflorum* H. & A. The former is much more villous, the pod only 1-seeded, while the latter is probably a synonym of *T. megalanthum*. F.M. Neg. 2019.

Arequipa: Mollendo, creeping on grassy upper slopes, *Johnston 3571* (det. Johnst.; Weberbauer, 146). Posco, 650 meters, (*Günther & Buchtien 275*, det. Bruns, *T. grandiflorum*). Ravine north of Atiquipa, *Worth & Morrison 15658* (det. Johnst., *T. megalanthum*). Chile.

Trifolium hybridum L. Sp. Pl. 766. 1753.

Stems erect or decumbent at base, usually 2–several dm. high; leaves long-petioled, the obovate more or less retuse leaflets 1–3 cm. long with numerous parallel nerves; peduncles elongate, the umbels about 12-flowered, the flowers white to rose-colored, 7–8 mm. long; calyx 5-nerved, pale, the pedicels usually as long; pods 2–4-seeded, the oval seeds reddish.

Lima: San Buenaventura, rocky thicket, petals pale and amparo purple, *Pennell 14564*(?) (specimen seen meager). Introduced from Europe.

Trifolium peruvianum Vog. in Meyen, Obs. Bot. 12. 1843. *Trifolium Weberbaueri* Ulbr. Repert. Nov. Sp. 2: 2. 1906.

Stems several–many, procumbent from a woody caudex; stipules broad, scarious-membranous, the free apex acuminate; petioles 12–18 mm. long, pilose as the leaflets especially on the midnerve, these obovate, serrulate; heads subsessile, the peduncles rarely 1 cm. long, many-flowered, the greenish-white or pale pink corollas 5 mm. long or shorter, on pedicels 1–1.5 mm. long; calyx somewhat pilose, the subequal subulate acuminate teeth scarcely equaling the tube; pod membranous, glabrous, with 2–3 seeds. Description after Vogel.—Often densely tufted, the subsessile flower heads concealed in the abundant leaves, or the stems when more developed rarely attaining 2 dm. *T. chiclense* Ball, Journ. Linn. Soc. Bot. 22: 35. 1885, is according to description referable here except that the heads are only 4–8-flowered; it may become var. **chiclense** (Ball) Macbr., comb. nov. F.M. Negs. 2025; 2029 (*T. Weberbaueri*).

Cajamarca: Above Hualgayoc, 4,000 meters, *Weberbauer 3965;* 271.—Lima: Río Blanco, stony grassy slopes, *2996; 749*. Chicla,

(*Ball*, type, *T. chiclense*). Baños, *Wilkes Exped.*—Junín: La Quinua, *2024* (var. *chiclense*).—Cuzco: Open rocky slopes, flowers white, 3,500 meters, *Pennell 13596*. Pucará, 3,700 meters, *Weberbauer 404* (type, *T. Weberbaueri*); 185. Near Cuzco, (*Herrera 200*).—Puno: Orurillo, *Soukup 552*. Chuquibambilla, thin soil over limestone on puna, flowers white, 3,900 meters, *Pennell 13393; 13355*. Lake Titicaca, *Meyen*, type. "Chicmu," "layo."

Trifolium repens L. Sp. Pl. 767. 1753.

Glabrous, the roundish-obovate denticulate leaflets usually 1–1.5 cm. long, exceeded by the slender peduncle that bears many shortly pediceled, finally deflexed, typically white flowers, these ordinarily 8 mm. long; calyx teeth slender, shorter than the tube; pods with 4–6 seeds.—The white clover of cultivation.

Junín: Río Blanco, on flat by river trail, *728*.—Cuzco: Near Cuzco, *Vargas 655*. Introduced from Europe. "Trebol."

68. MEDICAGO [Tourn.] L.

Similar to *Melilotus*, but the flowers often in heads or the racemes short and spike-like, the 1–few-seeded pods curved or spirally falcate, sometimes spinescent.

Medicago hispida Gaertn. Fruct. 2: 349. 1791. *M. denticulata* Willd. Sp. Pl. 3, pt. 2: 1414. 1803.

Low prostrate or ascending glabrate annual with obovate more or less denticulate leaflets and peduncles bearing 1–5 (8) small yellow flowers, or 1–3 subsessile laxly coiled tuberculate or usually conspicuously spinose pods about 5 mm. broad.—*M. denticulata* Willd. has been treated as a var. by Urban, the pods with spines about as long as the width of a spiral; there are numerous other named variations of doubtful taxonomic import, as var. *confinis* (Koch) Asch. & Graebn., the pod espinose. *M. truncatula* Gaertn. is to be expected and may be known by the more rigidly and more sparsely spinose pods.

Ancash: Pomabamba, *Raimondi*.—Cajamarca: Chota, Cutervo, *Raimondi*.—Lima: Río Blanco, 3,000 meters, *Killip & Smith 21586*. Matucana, *77*.—Huánuco: Mito, *1739*. Near Huánuco, *Stork & Horton 9378*.—Ayacucho: Huanta, *Raimondi*.—Arequipa: Atiquipa, *Raimondi*. Introduced from Europe. "Trebol."

Medicago lupulina L. Sp. Pl. 779. 1753.

Decumbent, lightly pilose with broadly obovate minutely serrulate leaflets, serrate stipules and small yellow flowers crowded in well-peduncled racemes about 1 cm. long; pods curved, reticulate, appressed pilose, espinulose.

Lima: Río Blanco, *Killip & Smith 21567*.—Huánuco: Mito, *1559*.—Cuzco: Near Cuzco, *Vargas 945*.—Puno: Salcedo, *Soukup 833*. Introduced from Europe. "Trebol."

Medicago sativa (L.) Sp. Pl. 778. 1753.

Tufted with glabrate stems decumbent or ascending at base, usually several dm. high; leaflets oblanceolate, usually about 2 cm. long, dentate, often mucronate at the obtuse to emarginate tip; peduncles elongate, 2–5 cm. long, the violet flowers 7 mm. long; pod puberulent, with 2 or 3 spirals.—The alfalfa or lucerne, native of Europe, is cultivated for forage, and the race at Salaverry, densely pubescent, was named forma *salaverryensis* Macbr. Field Mus. Bot. 8: 97. 1930 (var. *polia* Brand, U. S. Dept. Agric. Bur. Pl. Ind. Bull. 118: 23. 1907) the "Alfalfa del Peru." Illustrated, Degener, Fl. Hawaii.

Libertad: Salaverry, *48*. Introduced from Europe. "Alfalfa," "lucerne," "omas."

69. MELILOTUS [Tourn.] Juss.

Annual or biennial herbs with pinnately 3-foliolate leaves, the leaflets usually denticulate, and small yellow or white flowers borne in slender, axillary peduncled racemes, these without bracts or bractlets or the former minute. Calyx teeth subequal. Vexillar stamen free, at least above the middle. Ovary few-ovuled. Pod subglobose or ovoid, coriaceous, wrinkled, scarcely dehiscent.

Melilotus alba [Med.] Desr. in Lam. Encycl. 4: 63. 1797.

Tall with slender branches, the oblong leaflets truncate emarginate or rounded apically, 1–2 cm. long; flowers white, nodding, about 4 mm. long, the racemes often 1–2 dm. long; pod glabrous.

Cuzco: Prov. Convención, *Vargas 250*. Ollantaytambo, 2,900 meters, (*Herrera*). Naturalized from Europe.

Melilotus indica (L.) All. Fl. Ped. 1: 308. 1785. *Trifolium melilotus indica* α. L. Sp. Pl. 765. 1753. *M. parviflora* Desf. Fl. Atlant. 2: 192. 1800.

Low, erect or often diffuse annual with yellow flowers; upper leaflets oblong, nearly serrulate around the tip; pod 2 (2.5) mm. long, globose, reticulate, rugose.—The similar yellow sweet clover, *M. officinalis* (L.) Lam. is taller, the pods 3–4 mm. long. Plant used for fodder. Some authorities write the name *M. melilotus indicus* (L.) Asch. & Graebn.

Lima: Roadsides, *62*. Obrajillo, *Wilkes Exped.* Matucana, *238*.—Huánuco: *Sawada P.67*.—Arequipa: Camaná, *Raimondi*.—Cuzco: *Herrera 313*. Valle del Apurímac, *Herrera*. Calca, *Vargas 497*. Adventive from Europe. "Trébol macho," "white sweet clover."

70. CROTALARIA L.

By Harold A. Senn[1]

Reference: Senn, in Rhodora 41: 317–367. 1939.

Annual or perennial, prostrate to erect herbs, or small shrubs. Leaves in the Peruvian species simple or digitately trifoliolate. Stipules present or absent, in some instances decurrent on the stem. Inflorescence a raceme, terminal or opposite the leaves. Flowers in Peruvian species yellow or yellow variously tinged with red. Standard roundish or obovate; keel beaked. Stamens 10, united into a sheath which is split above. Legume 2-valved; inflated.

More than 400 species chiefly in tropical and warm temperate regions of both hemispheres, 300 of these in Africa. An Indian species is the source of the Sunn Hemp, and several, including *C. anagyroides*, are extremely important for soil improvement, especially of sandy areas; cf. McKee & Enlow, U. S. Dept. Agric. Circ. 137. 1931.

Leaves simple.

Leaves broad (1.2–5.2 cm. wide); stipules when present not decurrent on the stem.

Calyx lobes broadly ovate; leaves obovate.....*C. retusa.*

Calyx lobes linear to lanceolate; leaves lanceolate to elliptic. *C. nitens.*

Leaves narrow (0.5–1.1 cm. wide); stipules when present decurrent on the stem.....*C. sagittalis.*

Leaves trifoliolate.

[1] Contribution No. 709, Division of Botany and Plant Pathology, Science Service, Department of Agriculture, Ottawa, Canada.

Legumes densely tomentose with spreading hairs; leaflets oval to obovate or orbicular.....*C. incana.*

Legumes appressed-pubescent, puberulous, or rarely almost glabrous; leaflets obovate to elliptic-lanceolate.

Legumes small (0.8–1.5 cm. long), almost sessile; flowers small; carina bent at a sharp right angle.....*C. pumila.*

Legumes large (2.3–3.5 cm. long), stipitate; flowers large; carina rounded.....*C. anagyroides.*

Crotalaria anagyroides HBK. Nov. Gen. & Sp. 6: 404. 1824. *C. Dombeyana* DC. Prodr. 2: 132. 1825.

Perennial herb or half-shrub to 1.5 meters high; upper branches coarse, striate, usually densely pubescent with yellowish-brown hairs; leaves trifoliolate, leaflets elliptic-lanceolate, 3–11.5 cm. long (av. 6 cm.) by 1.2–3 cm. broad (av. 2.2 cm.), under surface of leaf hirtellous, upper surface essentially glabrous; stipules minute, setaceous; inflorescence usually terminal, densely 15–many-flowered; flowers yellow or the standard slightly reddish; calyx tube broadly campanulate; calyx lobes triangular, short, 0.3–0.6 cm. long; calyx densely pubescent; carina rounded, 1–1.5 cm. long, approximately equaling the wings; carina and wings much exceeding the calyx; flowers borne on pedicels up to 1 cm. long, the bases of which are conspicuous after the flowers have fallen; legume stipitate, 2.3–3.5 cm. long, 1–1.5 cm. broad, appressed-pubescent or rarely becoming almost glabrous.—F.M. Neg. 1925. Illustrated, Rock, Legum. Pl. Hawaii, *pl. 58.*

Loreto: Balsapuerto, *Klug 2854.*—San Martín: Alto Río Huallaga, *Williams 5665; 6678.* Alto Río Huallaga, Juanjuí, *Klug 4355.* Zepelacio, near Moyobamba, 1,100 meters, *Klug 3378.*—Huánuco: Vicinity of Huánuco, 2,000 meters, *3229; Woytkowski 108.*—Junín: Chanchamayo Valley, 1,500 meters, *Schunke 1567.* Tarma, *Ruiz & Pavón.* Hacienda on Río Chinchao, Vilcabamba, *4987.*—Ayacucho: Aína between Huanta and Río Apurímac, 750–1,000 meters, *Killip & Smith 22541; 23120.*—Puno: Near Puno, 4,000 meters, *Soukup 335.*—Department indefinite: Cuiken, *Poeppig 1221.* Without locality, *Dombey.* Paraguay; Bolivia; Brazil; Colombia; Venezuela; very locally in Honduras, Mexico and the West Indies.

Crotalaria incana L. Sp. Pl. 716. 1753. *C. cytisifolia* Hoffmansegg ex Heyhnhold, Nomencl. Bot. Hort. 2: 171. 1840, nomen; Nachtr. Preis.-Verz. 25. 1842 in Linnaea 16: Litt.-Ber. 279. 1842.

Annual or occasionally perennial, much-branched, herbaceous to shrubby, pubescent, 0.3–1.2 meters high; leaves trifoliolate, leaflets oval to obovate or orbicular, 1.5–4 cm. long by 1–2.5 cm. wide, pubescent beneath or glabrescent; stipules small, setaceous, deciduous; racemes 5–many-flowered, lateral and terminal; flowers in Peruvian specimens greenish to brownish yellow with the standard often slightly reddish; calyx deeply lobed, the tube almost lacking, pubescent; calyx lobes almost linear, acuminate, about 1 cm. long; legume sessile, pendulous, pubescent with spreading brownish hairs, 2.5–3.5 cm. long.—Illustrated, Rock, Legum. Pl. Hawaii, *pl. 60.*

San Martín: Alto Río Huallaga, Tarapoto, Morales, 360–900 meters, *Williams 5672.*—Lima: San Rafael, 3,000 meters, *3138.* Chosica, 1,000 meters, *536.*—Huánuco: Mito, *1550.*—Junín: Prov. Tarma, between Palca and Carpapata, 2,900 meters, *Stork 10969.* La Merced, 600 meters, *5248.* Uspachaca, *1303.*—Cuzco: Yucay, *Soukup 762; 768.* Valle de Paucar, 3,000 meters, *Herrera 3363.* Valle del Apurímac, *Herrera 2129.* Paucartambo, about 3,500 meters, *Balls B6677.* Urubamba Valley, near Yucay, 3,000 meters, *Herrera 1378.*—Apurímac: Prov. Grau, Hacienda Lucie, Oropeza Valley, 2,000–3,000 meters, *Vargas 9760.* Abancay, 2,400 meters, *Stork, Horton & Vargas 10554.* Without exact locality, 2,600–2,700 meters, *Weberbauer 5852.*—Puno: Region of Puno, *Soukup 516.*—Without locality, *Weberbauer 5298.* Tropical and subtropical regions of both Old and New Worlds, probably being indigenous in America and introduced into the Old World.

Crotalaria nitens HBK. Nov. Gen. & Sp. 6: 399. 1824.

Herb or subshrub to 1 meter high, branching above, usually densely pubescent; leaves simple, short-petiolate, broadly lanceolate to elliptic, cuneate at the base, margined or slightly recurved, 4.5–10 cm. long, by 1.4–3.7 cm. wide, usually appressed-pubescent above and beneath; stipules minute or lacking; inflorescence terminal, 15–many-flowered; bracts and bractlets conspicuous, especially since peduncles frequently occur bearing several flowerless bracts; flowers yellow, with the standard red-striped on the outside; calyx lobes 1–2 times the length of the tube, linear to lanceolate, densely appressed-pubescent; legume essentially sessile, 3.5–4 cm. long, glabrous, dark purple to black at maturity.—F.M. Neg. 1938.

Loreto: Balsapuerto, 220 meters, *Klug 2848.* Río Nanay, *Williams 742; 664.*—San Martín: San Roque, 1,350–1,500 meters, *Williams 7133.*—Huánuco: Valley of Chinchao River, 1,200 meters,

Stork & Horton 9575. Vilcabamba, 2,000 meters, *4999.* Pozuzo, 600 meters, *4597.* Cuchero, *Poeppig 1411.*—Junín: Río Paucartambo Valley, 700 meters, *Killip & Smith 25296.* La Merced, 700 meters, *5247; Killip & Smith 23508.* Puerto Yessup, 400 meters, *Killip & Smith 26399.* Chanchamayo Valley, 1,200 meters, *Schunke 1423; 1450.* Without locality, *Soukup 1136.* Paraguay; Bolivia; Brazil; Colombia; locally in Central America and Mexico.

Crotalaria nitens HBK. var. **trichina** Macbr. Field Mus. Bot. 8: 94. 1930.

Leaves at first pubescent above, in age becoming glabrate or glabrous.

Loreto: Gamitanacocha, Río Mazán, 100–125 meters, *Schunke 212.* Caballo-Cocha on Amazon River, *Williams 2031; 2150.* La Victoria, *Williams 2774; 2786.* Lower Río Huallaga, *Williams 4692.*—San Martín: Pongo de Cainarachi, *Klug 2708.* Zepelacio, near Moyobamba, 1,200–1,600 meters, *Klug 3607.*—Junín: Chanchamayo Valley, *Schunke 331.* Huacapistana, 1,800–2,400 meters, *Killip & Smith 24103.*—Cuzco: Cerro de Cusilluyoc, 2,500 meters, *Pennell 14000,* type.—Ayacucho: Ccarrapa, between Huanta and Río Apurímac, 1,500 meters, *Killip & Smith 22327.* Ecuador.

Crotalaria pumila Ortega, Hort. Bot. Matrit. Dec. 2: 23. 1797. *C. lupulina* HBK. Nov. Gen. & Sp. 6: 402. *pl. 590.* 1824.

Annual or perennial, 4–30 cm. high, branches diffuse or decumbent, appressed-pubescent or glabrate; leaves trifoliolate, leaflets oblanceolate to oblong, 0.7–3.5 cm. long, puberulous beneath; stipules minute, setaceous, deciduous; inflorescence lateral or terminal, usually 1–5-flowered; flowers yellow with the standard frequently reddish on the outside; calyx lobes puberulous, narrowly triangular, about half the length of the corolla; carina bent at a sharp right angle, rostrum of the carina attenuate, 0.6–1.1 cm. long; legume almost sessile, puberulous, yellowish, 1.2–1.5 cm. long.

Piura: Vicinity of La Brea, *Haught & Svenson 11571.* Prov. Paita, Talara, *Haught 3.* Pariñas Valley, *Haught F.164.*—Lima: Along Río Chillón, near Viscas, 1,800 meters, *Pennell 14463.*—Huánuco: Mito, 3,000 meters, *3334.*—Junín: Uspachaca, *1319.*—Ayacucho: Huanta, 2,800 meters, *Killip & Smith 23334.*—Apurímac: Caderas de Abancay, 2,400 meters, *Vargas C481.*—Cuzco: Valle del Apurímac, *Herrera 2129.* Bolivia; Ecuador; Venezuela; Gala-

pagos Islands; Central America; West Indies; Mexico; Florida; southwestern United States.

Crotalaria retusa L. Sp. Pl. 715. 1753.

Annual, shrubby, erect, 0.3–1 meter high, puberulous; leaves simple, obovate or oblanceolate, apex slightly retuse or rounded, glabrous above, short-pubescent beneath, 3.5–9 cm. long by 1.2–3 cm. wide, short-petiolate; stipules minute, setaceous, or wanting; inflorescence a terminal many-flowered raceme; bracts linear or subulate, small; flowers large, showy, yellowish; standard with purple lines inside, chocolate to brown outside; calyx lobes broadly ovate, slightly pubescent; calyx tube campanulate, broadly truncate at the base; carina rounded; legume sessile, glabrous, 3–4 cm. long, purple to black at maturity.—Illustrated, Bot. Mag. 52: *pl. 2561*.

Loreto: Alto Río Itaya, San Antonio, *Williams 3524*. Iquitos, *Williams 3527*. Tropical and subtropical regions of both hemispheres, probably native to the Old World and adventive in America.

Crotalaria sagittalis L. Sp. Pl. 714. 1753, except var. β (?). *C. Matthewsana* Benth. in Hook. Lond. Journ. Bot. 2: 479. 1843.

Annual or perennial herbs becoming somewhat shrubby, erect, or somewhat spreading, villous with spreading yellowish hairs; leaves simple, lanceolate to linear, pubescent above and beneath with more or less spreading, yellowish hairs, very short-petiolate or sessile; stipules present on upper part of stem, triangular, acute, frequently lacking on lower part of stem; inflorescence terminal, few-flowered; bracts and bracteoles ovate-lanceolate to lanceolate, short-stalked; flowers yellow to greenish-yellow, corolla usually exceeding the calyx; calyx lobes lanceolate, pubescent; legume sessile, glabrous, 1.5–2.5 cm. long, yellowish or becoming black at maturity.—*Crotalaria Matthewsana* Benth. was based on *Mathews 1934*, collected at Casapi. Neither the type nor a photograph of the type has been examined. The species is closely related to *C. sagittalis*, if not conspecific with it, and may be placed here pending an examination of the type. Illustrated, Britt. & Brown, Ill. Fl. ed. 2. 2: 347.

Huánuco: Mito, 3,000 meters, *3265*. Bolivia; Colombia; Central America; the northern West Indies; eastern and central United States.

71. SPARTIUM L.

Broom-like shrubs, the nearly leafless branches terminating in racemes of showy yellow flowers, the sterile branchlets sharp-

pointed. Leaves 1-foliate, small, often lacking; calyces subspathaceous, with minute teeth. Keel incurved, acuminate. Stamens all connate in a tube, the anthers alternating short and long, the former versatile, the latter basifixed. Pods elongate, linear.

The shrub, sometimes tree-like, is cultivated in parts of South America for its fiber.

Spartium junceum L. Sp. Pl. 708. 1753.

Glabrous shrub 1–3 meters high with numerous finely striate cylindrical branchlets, commonly more or less fascicled or tufted; flowers about 1.5 cm. long on short thickish pedicels; young pods densely silky pilose, the mature ones suberect, slightly curved, about 6 cm. long, 1 cm. broad.

Thoroughly naturalized between 2,000 and 3,000 meters in many valleys of central Peru (Weberbauer), the upper portions of the plants commonly used for brooms, and as fodder. According to Woytkowski, the shrub has medicinal uses as "esparteina."—Illustrated, Clos & Lahitte, Arboles y Arbustos Cult. Argent. 4: *pl. 13, fig. 2.*

Lima: Matucana, *386.*—Junín: Tarma, *1034; Killip & Smith 21890.*—Amazonas: Near Chachapoyas, *Woytkowski 35; Williams 7565.*—Cajamarca: *Osgood & Anderson 33.*—Without locality, *Ruiz & Pavón.* Mediterranean region. "Retama," "talhui."

72. LUPINUS [Tourn.] L.

Reference: Charles Piper Smith, Species Lupinorum 1938–42.

Herbs, half shrubs or shrubs, sometimes annuals, exceedingly diverse in habit, alpine forms often prostrate or cespitose, those of middle and lower altitudes most frequently herbaceous, usually more or less tufted or not rarely shrubs or lignescent at least below. Leaves usually digitately several to many (5–16) foliate, the petioles adnately stipulate at base. Flowers in terminal racemes, usually in crowded verticils or sometimes few and subcapitate, yellow, various shades of blue or purple, less frequently white, the bracts, or rarely the bractlets if present, caducous or somewhat persisting. Calyx deeply bilabiate, the lips entire or 2–3 dentate. Banner broad, the wings connate apically including the incurved keel. Stamens monadelphous, the tube entire, the shorter anthers versatile, the longer basifixed. Pods oblong, more or less compressed, bivalved, septate.

Since the well-known authority found it impossible to furnish the manuscript for this genus, the descriptions and determinations,

unless noted, are taken from his work, particularly from Signatures 17–19: 257–304. 1941, comprising Paper 25, "A First Report on the Genus Lupinus in Peru," which is provided with a key, pages 297–304; there is a departmental index to the Peruvian species, pages 310–311. When any important change has been made in Smith's uniformly executed descriptions it has been at least my intention to indicate such modifications. His key, however, is not dichotomous; in devising one to conform to the type used in this work no attempt has been made to evaluate his classification. I wish to record, however, that in my opinion the species are largely founded on solitary "differences" which modern taxonomic methods will some day show to be contained within units properly based on greater concomitance of diagnostic characteristics. Smith himself has admitted in some species variation which usually he has accepted as constituting alone a specific character, as, for instance, keel ciliate or eciliate. Besides he has paid little or no attention to the influence on habit, size of vegetative parts or degree of pubescence by the environment; yet in the Andes the ecological factors may be important even in the same locality (cf., for example, the variations in *Astragalus*). My key, therefore, is scarcely more than a key to specimens and as unfortunately Smith based many of his species on collections in foreign herbaria before studying the material available in the United States I have had to try to fit these in from descriptions, no doubt with many misinterpretations. Finally it may be remarked that if so few extra-Peruvian species occur in Peru the fact is noteworthy for so large a genus; also the species-distribution—or apparent limitation—within the country suggests strongly that a scientific definition of the species by taxonomists has not yet been achieved. *L. bimaculatus* Desr. in Lam. Encycl. 3: 626. 1791, based on a garden plant said to have originated in Peru, seems to be entirely obscure and has not been included but to it Rose referred my *2261;* this according to Smith is *L. Holwayorum* which is included here in *L. condensiflorus.*

Annuals, erect or suberect; banner of flowers glabrous; keel rarely eciliate.

Flowers 8–12 mm. long.

Keel ciliate; flowers usually verticillate or scattered.

Leaflets, at least some, 6–8 mm. wide.

Upper calyx lip bidentate; stems lanuginose.

L. Gaudichaudianus.

Upper calyx lip bifid; stems villous.

Stem fistulose, often branched.....*L. Lindleyanus.*

Stem solid, unbranched.....*L. lorenzensis.*

Leaflets 3–4 mm. wide.

Leaflets to 15 mm. long, conduplicate; ovules 2.
L. microcarpus.

Leaflets often longer, often flat; ovules 3 or more.

Ovules 4–6; pedicels 1–2 mm. long; flowers few or verticils few.....*L. Lindleyanus.*

Ovules 7–8; pedicels 2–3 mm. long; flower verticils 7–10.
L. syriggedes.

Keel eciliate; flowers capitate.....*L. mollendoensis.*

Flowers 16–20 mm. long; keel usually ciliate.....*L. mutabilis.*

Perennials (sometimes flowering as annuals(?), probably biennial but banner then pubescent or keel ciliate) herbaceous or more or less shrubby, sometimes ligneous to racemes. *L. mutabilis,* the stems sometimes hard, might be sought here.

Plants completely or partly herbaceous, often more or less tufted perennials or if more or less lignescent usually depressed, cespitose or prostrate; upper calyx lip often bifid, always so if plants are lignescent. Contrast, page 464.

Plants completely herbaceous often nearly acaulescent or the fleshy stems simple, the terminal more or less fleshy; peduncles erect in flower and solitary or clustered with the leaves on the crown of the perennial root; plants except *L. ananeanus* a dm. high or higher.

Leaves well-exceeding the racemes; bracts 5–10 mm. long, appressed-sericeous except *L. ananeanus.*

Plants about 2 dm. high.

Flowers violet; banner pubescent.

Flowers to 9 mm. long; calyx villous.....*L. chilensis.*

Flowers to 12 mm. long; calyx appressed sericeous.
L. pinguis.

Flowers yellow; banner glabrous.....*L. chrysanthus.*

Plants scarcely if ever 1 dm. high.....*L. ananeanus.*

Leaves rarely as long as the racemes; bracts villous (except *L. montanus*) or only 4–7 mm. long or little longer.

Bracts linear, long-villous except in *L. montanus,* often about as long or longer than the flowers, these rarely yellow.

Bracts long-villous, 8–20 mm. long or flowers yellow.

Flowers yellow.....*L. cuzcensis.*

Flowers not yellow.

Petiole-pubescence in part conspicuously villous; banner pubescent.

Bracts persisting, 15–20 mm. long. *L. Weberbaueri.*

Bracts caducous, 8–12 mm. long. . *L. arequipensis.*

Petiole-pubescence minute or mostly or entirely short-lanate; banner glabrous. . *L. huaronensis.*

Bracts sericeous.....*L. montanus.*

Bracts lanceolate-linear or ovate, 4–7 (8) mm. long; flowers never yellow.

Keel eciliate; flowers (except *L. aridulus*) 12–15 mm. long.

Leaflets more or less sericeous above.

Bracts and calyces rather laxly villous. . . *L. Fieldii.*

Bracts and calyces appressed sericeous.

Leaflets to 5 mm. wide; banner ovate. *L. Kalenbornorum.*

Leaflets to 7 (12) mm. wide; banner suborbicular. *L. malacotrichus.*

Leaflets glabrous above.

Pedicels about 2 mm. long; wings 4 mm. wide. *L. cymboides.*

Pedicels longer; wings twice as wide. . . *L. misticola.*

Keel usually ciliate; flowers 8–12 mm. long; stems strigillose.

Pedicels 3–4 mm. long.....*L. Lechlerianus.*

Pedicels about 1 mm. long.

Flowers 10–12 mm. long, the keel ciliate. *L. Oquendoanus.*

Flowers 8–10 mm. long, the keel rarely ciliolate. *L. aridulus.*

Plants usually more or less lignescent, sometimes openly branched, rarely simple or flowering when herbaceous (as *L. chlorolepis, L. Franciswhittieri*), most species depressed, cespitose or prostrate-ascending, a few tall or

open in habit and more or less herbaceous (cf. also *L. cymboides, L. aridulus*).

Leaflets broader than linear, all or mostly 2.5 cm. long or longer, membranous, green; banner (except *L. arequipensis, L. juninensis*) glabrous; plants erect or spreading.

Stems soon glabrous or strigillose-puberulent or appressed-sericeous with few if any long-villous trichomes.

Stipules (the lower) 6–10 mm. long; upper calyx lip bidentate or bifid (*L. urubambensis*); pedicels spreading pubescent.

Pedicels about 3 (4) mm. long; plants bushy and spreading or ligneous.

Upper calyx lip bidentate, 5–8 mm. long.

Bracts 10–12 mm. long; calyx lips 5 and 6 mm. long. . . . . *L. Cookianus.*

Bracts 5–8 mm. long; calyx lips 6–8 and 7–9 mm. long. . . . . *L. semiprostratus.*

Upper calyx lip bifid, 3–4 mm. long.

Banner glabrous. . . . *L. urubambensis, L. Ynesiae.*

Banner pubescent. . . . . *L. juninensis.*

Pedicels about 6 mm. long; erect, strict, subherbaceous. *L. Hornemanni.*

Stipules about 5 mm. long; pedicels 4–5 mm. long; upper calyx lip bifid.

Leaflets shortly sericeous beneath; pedicel pubescence subascending. . *L. disjunctus, L. Albertsmithianus.*

Leaflets lanate-puberulent beneath; pedicel pubescence spreading. . . . . *L. Hornemanni.*

Stems more or less villous as well as puberulent (*L. aridulus* might be sought here).

Flowers about 11 mm. long; banner glabrous; leaflets rarely 8 mm. broad. *L. Lindleyanus, L. Franciswhittieri.*

Flowers about 13 mm. long, the banner pubescent; leaflets often much broader. . . . . *L. arequipensis.*

Leaflets at most 2.5 cm. long or ashy-pubescent or linear.

Leaflets at least the larger about 2 cm. long.

Leaflets narrowly linear, ashy-strigose. . . . . *L. romasanus.*

Leaflets oblanceolate or broader at middle.

Stems prostrate-ascending; leaflets 3–7 mm. wide.
L. chlorolepis.

Stems suberect, woody; leaflets 2–3 mm. wide.
L. sarmentosus.

Leaflets at least the larger rarely 15 mm. long (cf. *L. chlorolepis*).

Peduncles obsolete.

Petioles slender, 2–4 cm. long.....*L. conicus.*

Petioles mostly or all shorter.....*L. pulvinaris.*

Peduncles obvious.

Petioles often in age about 2 cm. long or longer; leaflets flat or conduplicate.

Leaflets densely sericeous; stems short.

Leaflets strongly involute, narrow....*L. carazensis.*

Leaflets flat.

Pubescence all appressed.....*L. Pickeringii.*

Pubescence in part spreading villous.
L. peruvianus.

Leaflets glabrous or glabrate at least in age above; stems slender, a dm. or so long, glabrate (typically).....*L. Gilbertianus.*

Petioles 3–15 mm. long; leaflets revolute, 1 (2) mm. broad (cf. *L. Gilbertianus, L. sarmentosus*).

Pubescence appressed.

Flowers 9–10 mm. long; keel typically ciliate; stems ascending.....*L. Dorae.*

Flowers 6–7 (8) mm. long; keel eciliate; stems prostrate, often matted.
L. microphyllus, L. allargyreius.

Pubescence at least in part villous-hirsute, spreading.

Leaflets densely strigose both sides.

Leaflets to 7 mm. long.....*L. chavanillensis.*

Leaflets much longer.....*L. peruvianus.*

Leaflets glabrous above or pubescence sparse.
L. prostratus.

Plants except *L. Lechlerianus* definitely in part lignescent, or densely silky-tomentose, usually branched and erect, infre-

quently half shrubs, usually shrubs and the branchlets (if these) herbaceous; upper calyx lip entire or bidentate except in *L. Albertsmithianus, L. juninensis.*

Pubescence of pedicels appressed or subappressed, firm.

Leaflets soon glabrous or sparsely pubescent above or the trichomes long, lax.

Pedicels at least mostly more than 4 (4–10) mm. long.

Bracts subpersisting; half shrubs or semiherbaceous.

Perennial herb; flowers 6–8 mm. long. *L. Lechlerianus.*

Shrubs or half shrubs.

Flowers about 8 mm. long. *L. saxatilis.*

Flowers about 13 mm. long.

Keel eciliate (as to type). *L. condensiflorus.*

Keel ciliate. *L. Mathewsianus.*

Bracts caducous; tall shrubs or tree-like.

Flowers 12–15 mm. long; leaflets 2–3 cm. long. *L. praealtus, L. paniculatus.*

Flowers about 11 mm. long; leaflets to 4 cm. long, 10 mm. wide. *L. Albertsmithianus.*

Pedicels 2–4 mm. long.

Banner pubescent; bracts subpersisting.

Keel eciliate; petioles to about 3 cm. long. *L. condensiflorus.*

Keel ciliate; petioles 3–5 cm. long. *L. Ellsworthianus.*

Banner glabrous or nearly; bracts deciduous.

Leaflets to 3 cm. long; lower calyx lip merely arcuate.

Keel eciliate.

Leaflets to 4 mm. wide. *L. ramosissimus.*

Leaflets 6–10 mm. wide. *L. semiprostratus.*

Keel ciliate. *L. carpapaticus.*

Leaflets to 1.5 cm. long; lower calyx lip incurved especially in bud. *L. hamaticalyx.*

Leaflets evenly often densely sericeous above as usually beneath, the trichomes appressed.

Leaflets to 6 mm. broad; upper calyx lip entire or nearly. *L. Jelskianus.*

Leaflets to 12 mm. broad; upper calyx lip bidentate.

Flowers 16–20 mm. long; banner pubescent. . *L. notabilis.*

Flowers 13–14 mm. long.

Banner glabrous or nearly. . . . . *L. Gayanus.*

Banner pubescent. . . . . *L. Herreranus.*

Pubescence of pedicels villous, spreading, or at least divaricate-ascending (cf. *L. Lechlerianus; L. Gayanus*).

Leaflets densely villous (trichomes more or less spreading) or densely appressed-sericeous at least above.

Pubescence of branchlets at least in part more or less spreading, short-villous-tomentose or in part (at least) long-villous; petioles, except in *L. eriocladus*, long.

Branchlets short-villous-tomentose with more or less spreading trichomes.

Petioles of the flowering branchlets not much if at all longer than the longer leaflets, mostly or all shorter than 2.5 cm. or a few about 3 cm. long. *L. eriocladus.*

Petioles of the flowering branchlets usually or mostly 4–6 cm. long or longer.

Banner glabrous; pedicels 2–4 mm. long. *L. Ulbrichianus.*

Banner at least in bud, pubescent.

Pedicels about 2 mm. long. . . . *L. sufferugineus.*

Pedicels 6–8 mm. long.

Leaflets oblong-linear, to about 4 mm. wide. *L. Ballianus.*

Leaflets broadly oblong or oblanceolate, to 10 mm. wide.

Leaflets oblanceolate. . . . . *L. tomentosus.*

Leaflets oblong, acute. . . *L. Pipersmithianus.*

Branchlets long-villous or the pubescence only in part appressed; petioles long.

Stems spreading-villous.

Leaflets sericeous.

Pedicels 5–8 mm. long; bracts 5–7 mm. long. *L. Staffordiae.*

Pedicels 4–5 mm. long; bracts 8–10 mm. long. *L. Munzianus.*

Leaflets laxly villous.....*L. Hinkleyorum.*

Stems subappressed villous and sericeous.
L. Werdermannianus.

Pubescence of branchlets entirely appressed-sericeous or strigose with ascending trichomes; petioles at most about 3 (4) cm. long, often shorter.

Leaflets oblanceolate.

Leaflets about 2 cm. long.

Upper calyx lip dentate.

Pedicels 3–4 mm. long; leaflets to about 3 mm. wide.

Branchlets strigose or glabrate; petioles about 3 cm. long.....*L. praetermissus.*

Branchlets densely sericeous; petioles often shorter.....*L. brachypremnon.*

Pedicels 5–8 mm. long; leaflets to 6 mm. wide.
L. tarapacensis.

Upper calyx lip entire; pedicels 5–7 mm. long.
L. Ledigianus.

Leaflets about 3 cm. long or longer (cf. *L. notabilis*).

Upper calyx lip entire; stem pubescence appressed.
L. exochus, L. perblandus.

Upper calyx lip bidentate; stem pubescence ascending-spreading.....*L. tomentosus, L. Ballianus.*

Leaflets broadly obovate, nearly half as broad as long.
L. toratensis.

Leaflets glabrous or glabrate above, the pubescence if any not conspicuously and usually not uniformly dense or in this case the mature leaflets greenish, the petioles long.

Petioles of the flowering branchlets not much if at all longer than the leaflets, mostly or all shorter than 2.5 cm., at most about 3 cm. long; leaflets glabrous or glabrate above.

Leaflets obovate, nearly half as broad as long, to 1 cm. long.....*L. visoensis.*

Leaflets oblanceolate or oblong-elliptic, longer.

Leaflets little more than 3 times longer than broad.

Keel eciliate.

Leaflets to 1.5 cm. long, 4 mm. wide; pedicels 5–8 mm. long. . . . . *L. Richardianus.*

Leaflets to 2.5 cm. long, 7 mm. wide; pedicels 3–4 mm. long. . . . . *L. Macbrideanus.*

Keel ciliate. . . . . *L. appositus.*

Leaflets 4 to 6 times longer than broad.

Keel ciliate; leaflets 1.5–2 cm. long. . . *L. appositus.*

Keel eciliate; leaflets longer.

Pubescence of branchlets appressed or subappressed.

Shrub; leaflets appressed-sericeous beneath; bracts subpersisting. *L. Wilkesianus, L. paniculatus.*

Tree; leaflets rather loosely pubescent beneath; bracts caducous. . . . . *L. praealtus.*

Pubescence of branchlets spreading villous. *L. Goodspeedii.*

Petioles mostly or all 3 cm. long or longer, mostly 4–6 cm. long or longer; leaflets sometimes more or less appressed-sericeous above but greenish.

Leaflets to 3 mm. broad.

Flowers about 13 mm. long. . . . . *L. Lobbianus.*

Flowers about 7 mm. long. . . . . *L. Lechlerianus.*

Leaflets 5–10 mm. broad.

Leaflets more or less appressed-sericeous above.

Banner pubescent.

Pedicels 3–4 mm. long; calyx lip toothed.

Leaflets 5–7 mm. wide. . . . . *L. juninensis.*

Leaflets about 4 mm. wide. . . . *L. praetermissus.*

Pedicels longer; calyx lip entire. . . . . *L. exochus.*

Banner glabrous; upper calyx lip bidentate. *L. Cookianus.*

Leaflets glabrous or glabrate above.

Keel glabrous; upper calyx lip bidentate.

Pedicels about 3 mm. long. . . . . *L. semiprostratus.*

Pedicels to about 6 mm. long.

Plants herbaceous above. . . . . *L. Hornemanni.*

Plants except branchlet tips lignescent.
L. Macbrideanus.
Keel ciliate, pubescent; upper calyx lip bifid.
L. Albertsmithianus.

Lupinus Albertsmithianus C. P. Smith, Sp. Lupin. 279. 1941.

Erect branching shrub to 12 dm. high, the slender branches sparsely appressed-sericeous, the leaves green and glabrous above, somewhat short-sericeous beneath; petioles 3–5 cm. long, slender, with 6–7 oblong-oblanceolate acute and apiculate flat leaflets to 4 cm. long, 10 mm. broad; peduncles to 8 cm. long, the racemes to twice as long with many verticils; bracts lanceolate, subulate, to 7 mm. long, deciduous; pedicels 4–5 mm. long, the pubescence ascending-spreading or early subappressed; flowers about 11 mm. long; upper calyx lip bifid, 4–5 mm. long, the lower entire, 6–7 mm. long; banner suborbiculate with an obscure medial line of pubescence, the wings to 5 mm. broad, the keel ciliate; ovules 5; pods 4 cm. long, 10 mm. broad, sublanceolate, sericeous; seeds pale brown, mottled and with a curved transverse dark line.—A slender shrub with greenish-yellow glabrate branches; pedicels often hardly 4 mm. long with pubescence slightly spreading; wings deep blue, the keel and banner slightly paler. Name hyphenated by the author. The leaflets are mostly 2–3 cm. long, 4–6 mm. wide, but the species is probably not always separable from *L. Ellsworthianus.* The upper calyx lip of the Huánuco specimen is merely bidentate.

Junín: Huacapistana, open hillside, *Killip & Smith 24196*, type.—Huánuco: Piedras Grandes, 3,000 meters, *Woytkowski 138.*

Lupinus allargyreius C. P. Smith, Sp. Lupin. 269. 1941. *L. microphyllus* Benth. var. *argyreius* Ball, Journ. Linn. Soc. Bot. 22: 35. 1885.

Depressed little shrub, the stems a few cm. long; petioles 3–12 mm. long, glabrous or appressed-sericeous; leaflets 5–7, green, rather sparsely subappressed hirsute, 2–5 mm. long, about 1 mm. broad; pedicels 2–3 cm. long, often curved, fleshy, glabrate or sparsely and laxly pilose; racemes subcapitate; bracts deciduous; flowers 5–8 mm. long, subsessile; calyx subappressed-sericeous, the upper lip bifid, about 3 mm. long, the equal lower one entire; banner narrow, the keel eciliate; ovules 3; pods 10–12 mm. long, about 4 mm. broad.—More than likely this is an extreme tufted variety of *L. microphyllus.*

Junín: Casapalca, alpine basin slopes, *871;* (*Ball*, type). Yauli, (*Weberbauer 5125*); short grass slope, *932.*—Lima: Río Blanco, wet

mossy slope, *783*.—Puno: Near Puno, Araranca, 4,100 meters, *Pennell 13440*.

Lupinus ananeanus Ulbrich, Bot. Jahrb. 37: 548. 1906; 260. *L. Cruckshanksii* Gray in U. S. Expl. Exped. Bot. 1: 393. 1854, not Hook. 1831. *L. Asagrayanus* C. P. Smith, Sp. Lupin. 260. 1941.

Densely tufted herbaceous perennial, the few-flowered racemes concealed among the leaves, the plants 5–8 cm. high; stems obsolete or short; petioles 2–6 cm. long, densely as the 7–11 leaflets, villous-hirsute, the latter glabrate above, conduplicate, linear-oblanceolate, 1–2.5 cm. long, 2–5 mm. broad; peduncles little if at all developed, the racemes about 2 cm. long, capitate; bracts linear-lanceolate, deciduous or more or less persisting, shorter than the subsessile flowers, these 8–10 mm. long, white or pale purple; calyx villous-hirsute, the upper lip bifid, the lower entire or tridentate; banner glabrous, the wings 4–5 mm. broad, the keel ciliate or eciliate; ovules 3 or 4; pods to 15 mm. long, a third as broad, the purplish seeds mottled.—Smith distinguishes two species principally on the basis of plants unbranched, pubescent, soft-villous, this the plant of Gray, and plants much branched from the root crown, the pubescence hirsute, nettle-like. *L. breviscapis* Ulbr. Meded. Rijks Herb. Leiden 27: 47. 1915 seems to be the same. F.M. Neg. 1973.

Junín: Alpamarca, *Wilkes Exped.* (type, *L. Cruckshanksii*). Cerro de Pasco, (*Cruckshanks*).—Ayacucho: Between Pasco and Aya, *Weberbauer 5447*.—Arequipa: Cailloma, *Karl Schmidt*.—Cuzco: Region of Cuzco, *Gay*.—Puno: Ananea, 4,700 meters, *Weberbauer 1022*, type.

Lupinus appositus C. P. Smith, Sp. Lupin. 155. 1940.

Much-branched shrub a few dm. high, the slender stems probably subsericeous, the leaves glabrous above, subsericeous beneath; stipules ovate-aristate to 5 mm. long; petioles about 15 mm. long, the leaflets 1.5–2 cm. long, flat or conduplicate, acute; peduncles 2–3 cm. long, the racemes to 8 cm. long; bracts ovate-aristate to 4 mm. long, tardily deciduous; pedicels 4–5 mm. long, spreading-pubescent; flowers about 13 mm. long, the calyces sericeous; upper calyx lip bidentate, 4 mm. long, the lower lanceolate, entire; banner suborbiculate, densely sericeous above the middle, the wings to 6 mm. broad, the keel ciliate.

Lima: Puruchuca, (*Mathews 479*, in part, type).

Lupinus arequipensis C. P. Smith, Sp. Lupin. 280. 1941.

Plants 6–9 dm. high, the stems stout fistulose, densely lanate and conspicuously villous, branched above; petioles 5–12 cm. long, minutely lanate and spreading villous; leaflets 7–9, to 7 cm. long, 16 mm. broad, flat, green and finally glabrous above, scarcely sublanate beneath; peduncles 6–8 cm. long, stout, villous, the dense racemes 1–1.5 dm. long; bracts 8–12 mm. long, linear, yellowish villous, caducous; pedicels 3–4 mm. long, spreading pubescent; flowers about 14 mm. long, the densely lanate villous calyces with upper lip bifid, 4 mm. long, the subequal lower entire; banner suborbiculate, lightly pubescent near tip, the wings broad, the keel eciliate.—Possibly annual or biennial; petals deep purple, the banner yellow medially. Here might be sought *L. tominensis* Wedd. Chlor. And. 2: 251. 1857 of Bolivia.

Arequipa: Mollendo, *Hitchcock 22378*, type.

Lupinus aridulus C. P. Smith, Sp. Lupin. 271. 1941.

An erect perennial, branched at base, the appressed-pubescent and subvillous stems 1–3 dm. long; petioles 3–4.5 (8) cm. long with 6–8 leaflets to 18 (–5 cm.) mm. long, 4 (–10) mm. broad, oblanceolate, obtuse, mostly flat, green and glabrate above, subappressed-sericeous beneath; peduncles 2–4 cm. long, the racemes somewhat fistulose, 3–6 cm. long, exceeding the leaves, with 6–8 verticils; flowers 9–10 mm. long, the bracts linear, persisting, 3 mm. long, the pedicels about 1 mm. long, spreading pubescent; upper calyx lip bifid, 3 mm. long, the lower if at all longer, entire or minutely bi- or tridentate; banner broadly ovate, somewhat pubescent near tip, the wings 3–4 mm. broad, the keel typically eciliate.—The collector noted the petals as violet, the banner yellow medially; it seems highly probable that the plant is at least a short-lived perennial; the second specimen seen from the type locality is poor and may not belong here. Probably affine *L. Lechlerianus*.

Puno: Araranca, 4,100 meters, *Pennell 13431*, type; *Pennell 13445*(?).—Cuzco: Near Cuzco, (*Herrera 3049?*, keel ciliolate). Prov. Canas, *Vargas 11023*(?). "Oquera-qquera."

Lupinus Ballianus C. P. Smith, Sp. Lupin. 169. 1940.

Low shrub, the branchlets and petioles loosely pubescent, the latter 3–4 cm. long; stipules 12–18 mm. long; leaflets appressed-pubescent both sides, oblong, acute or narrowed both ends, flat or conduplicate to 4 cm. long, 7 mm. broad; peduncles 3–5 cm. long,

the laxly flowered racemes a dm. long or longer, often with 12 or more verticils; bracts lanceolate, aristate, 8–10 mm. long, deciduous; pedicels spreading pubescent, 4–8 mm. long; flowers 13 mm. long or somewhat longer, the subappressed villous calyces with bidentate upper lip, the lower entire, arcuate, reflexing, 5–6 mm. long; banner suborbiculate, pubescent near tip, the wings 8 mm. broad, the keel eciliate.—The upper calyx lip of my *3034* is deeply bidentate, the stems tufted from a woody branched caudex, in habit resembling *L. romasanus* Ulbr. or *L. rupestris* HBK. of Ecuador, the leaflets of the latter glabrous above. My *476* was a round-topped plant.

Ancash: Ocros, *Weberbauer 2674*.—Lima: Chicla, Puruchuco, (*Mathews 479; John Ball*, type; *Safford 373; Weberbauer 227; Sargent 6; Seler 239*). Obrajillo, *Wilkes Exped.* Matucana, among rocks, *476*. Río Blanco, prostrate ascending, *3034*.—Ayacucho: Pauza, (*Martinet 539*).—Puno: Azangaro, (*Weberbauer 485*).

Lupinus brachypremnon C. P. Smith, Sp. Lupin. 294. 1941.

Erect much-branched shrub to 9 dm. high, densely and closely appressed silvery sericeous except the racemes, these softly spreading villous; stipules to 8 mm. long, free; petioles 0.5 to 2 cm. long with 5–9 linear-lanceolate acute, usually conduplicate leaflets, the larger 2–2.5 cm. long, 4 mm. broad; peduncles short, the racemes about 1 dm. long with 6–14 crowded verticils; bracts 7–10 mm. long, lanceolate, acuminate, persisting; pedicels 3–4 mm. long; flowers 11 mm. long, the upper calyx lip bidentate, the subequal lower entire; banner suborbiculate, pubescent, the wings about 4 mm. broad, the keel eciliate; ovules 3 or 4; pods 2 cm. long, about 7 mm. broad, softly villous.

Junín: Near Huancayo, 3,300 meters, open rocky hillsides, *Killip & Smith 23361*, type.—Huánuco: Cani, near Mito, *3483* (det. Smith, *L. Holwayorum*).—Ancash: Catuc, near Huaraz, stony slope, *2505* (det. Smith in herb. U. S. Nat. Mus., *L. Ballianus*).

Lupinus carazensis Ulbrich, Bot. Jahrb. 37: 545. 1906; 275.

Depressed branched shrub scarcely 1 dm. high, the decumbent branches more or less sericeous; stipules 5–8 mm. long; petioles 2.5–5 cm. long, appressed-sericeous with 6–8 linear acute partly conduplicate leaflets to 12 mm. long, 2 mm. broad; peduncles 3–7 cm. long, the short racemes subcapitate; bracts subpersisting; pedicels scarcely 0.5 mm. long; flowers 7–8 mm. long; upper calyx lip bifid, about 2 mm. long, the lower twice as long, minutely tridentate; banner

ovate or obovate, glabrous, the wings 2.5 mm. broad, the keel eciliate; ovules 4.—F.M. Neg. 1980.

Ancash: Above Caraz, 4,200 meters, *Weberbauer 3084*, type; 226.

Lupinus carpapaticus C. P. Smith, Sp. Lupin. 181. 1940.

A branched shrub to 12 dm. high, the stems minutely appressed-pubescent; stipules 5–6 mm. long; petioles 3–5 cm. long, very slender with 5–7 elliptic-oblong-oblanceolate leaflets, rounded at tip, flat, glabrous or glabrate above, subsericeous beneath, to 2.5 cm. long, 7 mm. broad; peduncles 6–8 cm. long, subfistulose, the racemes about twice as long with many crowded verticils; bracts 4–5 mm. long, appressed-sericeous, lanceolate, deciduous, the appressed pubescent pedicels 2–3 mm. long; flowers 10–12 mm. long; upper calyx lip bidentate, 4 mm. long, the lower entire, subsaccate, slightly longer; banner suborbiculate, glabrous, or with a few trichomes, medially yellow, the wings 7 mm. broad, the keel ciliate near tip.—Doubtfully distinct from *L. Ellsworthianus*. *L. bogotensis* Benth., often reported from Peru, might be sought here; it has longer bracts, pedicels 3–5 mm. long, flowers 13–15 mm. long.

Junín: Carpapata, above Huacapistana, open hillside, *Killip & Smith 24360*, type.

Lupinus chavanillensis (Macbr.) C. P. Smith, Sp. Lupin. 269. 1941. *L. microphyllus* Benth. var. *chavanillensis* Macbr. Field Mus. Bot. 8: 97. 1930.

Depressed shrub with divided or branched caudex; petioles 3–15 mm. long, subappressed-sericeous; leaflets 5–7, to 5 mm. long, often conduplicate; peduncles 1.5–2.5 cm. long, villous-hirsute, the racemes subcapitate; bracts 4–5 mm. long, ovate-lanceolate, persisting; flowers sessile, 10 mm. long; calyces densely subappressed-hirsute sericeous, the upper lip 3 mm. long, deeply bifid, the lower entire; petals narrow, the banner glabrous, suberect, 5 mm. broad, the keel eciliate; ovules 2 or 3; pods 10–12 mm. long, 6 mm. broad, densely appressed-sericeous.—Similar to *L. peruvianus*.

Huánuco: Chavanillo, dry grassy slope, 300 meters, *1963*, type.

Lupinus chilensis C. P. Smith, Sp. Lupin. 197. 1940.

Stoutly fistulose stemmed annual(?) branched from near the base, a dm. or two high, the branches and long petioles (7–13 mm. long) more or less densely subappressed or spreading-villous; leaflets 6 or 7, to 4 cm. long, 10 mm. broad, yellowish-green, subappressed-

villous especially beneath, acutish, the larger flat; racemes dense, much shorter than the leaves, sessile or nearly, the verticils few to many; bracts 5 mm. long, persisting; flowers 8–9 mm. long, subsessile; upper calyx lip 2–3 mm. long, bifid, the lower scarcely longer, entire; banner laxly villous near tip, the keel ciliate; ovules 4; pods to 18 mm. long, 6 mm. broad, densely villous, the brownish seeds light mottled, 4 mm. long.—From the Field Museum specimen this appeared to be a perennial and allied probably to *L. misticola.*

Tacna: Chislluma, 4,500 meters, *Werdermann 1167,* type.

Lupinus chlorolepis C. P. Smith, Sp. Lupin. 277. 1941.

Like *L. prostratus* in habit and probably only an ecological or vegetative phase but the stems only lignescent at caudex, the leaflets as to type 10–25 mm. long, 3–7 mm. broad, glabrous or glabrate above, more or less sericeous all over beneath, the pedicels 1 mm. long, the flowers 8–11 mm. long, the upper calyx lip bifid, 3–4 mm. long; banner glabrous.—In type the stems and petioles are rather spreading villous. The bracts are rarely subpersisting, 5 mm. long, ovate to linear-lanceolate and green; some plants are apparently flowering as annuals (cf. *L. Lindleyanus*). *Kalenborn 63* in part (judging from scrap seen) and my *798* it seems to me could both better be the state *L. Gilbertianus;* Rose determined my specimen as *L. prostratus!* Cf. *L. Kalenbornorum.*

Piura: Ayavaca, *Weberbauer 6377.*—Lima: Río Blanco, upland grassy slope, prostrate-ascending, *798.*—Junín: La Quinua, trailing or prostrate on moist grassy hillside, *2016; 2017.* Yauli, *Stork & Horton 10864.* La Oroya, (*Kalenborn 63* part; *142B*).—Huánuco: Near Huánuco, *2196.* Palca, (*Weberbauer 2482*). Yanahuanca, grasslands, 3,000 meters, *1291.* Mito, prostrate except flowering stalks, *1407; 1735.*—Cuzco: Near Cuzco, 3,000 meters, *Herrera,* type.—Puno: Azangaro, *Weberbauer 454.* "Toi-llersha."

Lupinus chrysanthus Ulbrich, Bot. Jahrb. 37: 543. 1906; 261.

A tufted herbaceous perennial, the long-petioled leaves well overtopping the short racemes, in this respect resembling *L. pinguis* but the thick stems more developed, minutely appressed pubescent and shortly villous with spreading trichomes; petioles 6–15 cm. long; leaflets 6–9, to 3 cm. long, about 4 mm. broad, oblanceolate, acute, flat, glabrous above, somewhat villous beneath; peduncles 1.5–3 cm. long, fleshy fistulose, the racemes 5–6 cm. long, with persisting linear bracts 8–9 mm. long, about 3 times longer than the pedicels;

flowers golden yellow, 13 mm. long; upper calyx lip bifid, 3 mm. long, the lower entire, 4–5 mm. long; banner glabrous, reflexed, the wings 4 mm. broad, the keel eciliate; ovules 7 or 8.

Ancash: Near Piscapaccha, 4,000 meters, bunchgrass formation, *Weberbauer 2891*, type; 224.

Lupinus condensiflorus C. P. Smith, Sp. Lupin. 154. Feb. 1940. *L. alimanens* C. P. Smith, Sp. Lupin. 162. Aug. 1940. *L. Holwayorum* C. P. Smith, l.c. 172 (Aug.).

A shrub probably attaining several dm., the stems minutely appressed-sericeous, the many leaves glabrous or glabrate above, more or less sericeous beneath; stipules 6–10 mm. long; petioles 2.5–3 cm., with 7–10 broadly oblanceolate leaflets, the larger 2 (3) cm. long, 5 (7) mm. broad; peduncles 4–6 cm. long, the longer racemes with 10 or more verticils; bracts persisting, 6–8 mm. long, ovate-lanceolate at base, long-aristate; pedicels appressed-pubescent, 3–8 mm. long; flowers about 13 mm. long, the upper lanceolate bidentate lip 4–5 mm. long, the lower slightly longer; banner pubescent, the wings broad, the keel eciliate; ovules about 5; pods 2–5 cm. long, appressed-pubescent.—The types were referred by Ulbrich to *L. bogotensis* Benth. and this is presumably the plant from Prov. del Cercado listed by Herrera under the name of Bentham, or the plant from Cercado could be *L. praealtus*, doubtful from range. The related species from Colombia has ciliate keel, oblong leaflets, spreading pubescent pedicels.

Lima: Huamantanga, (*Barclay*).—Huánuco: Llata, *2261*(?), keel ciliate.—Cuzco: Near Cuzco, *Pennell 13579* (det. Smith, *L. praealtus; Herrera 57*, type, in part, this number also, fide Smith, *L. Hornemanni*). High hill near Cuzco, (*Lobb*); Saxaihuamán, 3,500 meters, *Pennell 13565*, type; *Soukup 217; Holway & Holway 738* (type, *L. Holwayorum*); *Rose & Rose 19049*. Huasao, 3,200 meters, *Herrera 3043*. "Ckera," "pacha-ckera" (Herrera; cf. note above).

Lupinus conicus C. P. Smith, Sp. Lupin. 259. 1941.

Like *L. Pickingerii* and perhaps an ecological state but striking by the sessile inflorescence, this only 1–1.5 cm. long; petals lilac, all narrow, the keel obscurely ciliolate.

Lima: Río Blanco, 4,200 meters, *810*, type.

Lupinus Cookianus C. P. Smith, Sp. Lupin. 160. 1940.

Erect perennial at least 6 dm. high, the glabrate slender stems branched, mostly solid, the leaves green but somewhat sericeous

above, subsericeous beneath; stipules to 10 mm. long; petioles 4–6 cm. long with 5–8 oblanceolate acute apiculate leaflets to 4 cm. long, 9 mm. broad; peduncles about 6 cm. long, the racemes to twice as long; bracts lanceolate, sericeous, to 12 mm. long; pedicels spreading pubescent, about 3 mm. long; flowers to 12 mm. long; upper calyx lip bidentate to 5 mm. long, the slightly longer one entire; banner suborbiculate, glabrous, the wings broad, the keel eciliate; ovules 5 or 6; pods sublanate, about 3.5 cm. long, 8 mm. broad, the reddish-brown seeds mottled.—*L. arvensis* Benth., noted under *L. Hornemanni*, might be sought here.

Cuzco: San Miguel and Torontoy, *Cook & Gilbert 1140*, type.

Lupinus cuzcensis C. P. Smith, Sp. Lupin. 267. 1941.

Tufted perennial herb with the habit of *L. chrysanthus* but the fleshy fistulose stems longer and with the longer petioles (these to 16 cm. long) conspicuously long-villous as well as puberulent; leaflets 7–9, to 6 cm. long, 1 cm. broad, oblong, abruptly acute or apiculate, yellowish-green but subappressed short-villous both sides, the marginal trichomes and those on the midnerve beneath elongate; racemes 1.5–2 dm. long; bracts to about 10 mm. long, tardily deciduous; pedicels 1–3 mm. long; flowers yellow, 13 mm. long, the upper calyx lip bifid, the lower entire, both about 5 mm. long, softly villous; banner obovate, reflexed, pubescent near tip, the wings 3–4 mm. broad, the keel eciliate.—Evidently from clumps, the outer stems about 1.5 dm. long, ascending from a subprostrate base. Smith describes the bracts as deciduous, 4–6 mm. long.

Cuzco: La Raya, on rock ledges in cascade, 4,400 meters, *Pennell 13516*, type.—Arequipa: At about 4,500 meters, *Weberbauer 6874* (pubescence dense).

Lupinus cymboides C. P. Smith, Sp. Lupin. 265. 1941. *L. sericeolodix* C. P. Smith, l.c. 266.

Herbaceous hollow-stemmed perennial, the stems, at least above, closely to loosely silvery sericeous, erect or suberect, 6–8 dm. high, somewhat branched; stipules 10–15 mm. long; petioles 10–18 cm. long or those of the stems above scarcely half as long; leaflets 7–10, to 5.5 cm. long, 7 mm. broad, oblong-oblanceolate, shortly acute, mostly flat, glabrous above, green but appressed-sericeous with short trichomes beneath; racemes 1–2 dm. long, the flowers scarcely crowded but the 6–12 verticils poorly defined; bracts 7–8 mm. long, narrowly ovate, acuminate, persisting, the densely spreading or sub-

appressed villous pedicels nearly as long; flowers 15 mm. long; upper calyx lip bifid, 5–6 mm. long, the lower 8–10 mm. long, entire or tridentate, subsaccate, reflexing; banner obovate, pubescent, the wings 5–6 mm. broad, the keel obscurely if at all ciliate; ovules 4 or 5; pods 3.5 cm. long, nearly 10 mm. broad, sericeous.—Smith describes the Ledig plant calyx lip entire but it is actually bifid. According to the collector the banner is pinkish-blue, yellow at center, the wings and keel pink, the latter purple at tip. Cf. *L. macrostachys* Rusby, Bull. N. Y. Bot. Gard. 4: 342. 1907 (Dec.), not Rydb.

Junín: Near Huancayo, 3,300 meters, open rocky hillsides, *Killip & Smith 22139*, type. Acopalca Canyon near Huancayo, *Ledig 19* (type, *L. sericeolodix*); *Weberbauer 6527*. Bolivia?

Lupinus disjunctus C. P. Smith, Sp. Lupin. 284. 1941.

Erect, branching, ligneous below, 6–8 dm. high, the slender solid stems glabrous or glabrate; stipules about 5 mm. long, linear; petioles 3–3.5 cm. long, with 6–7 acute or obtuse oblong-oblanceolate flat leaflets to 4 cm. long, 8 mm. broad, green and glabrous and glabrate both sides, sometimes broadest at the middle; peduncles and racemes about a dm. long; bracts 3–4 mm. long, linear-lanceolate, deciduous, the ascending-pubescent pedicels as long; flowers about 2 mm. long; calyces appressed-sericeous, somewhat gibbous, the upper lip about 5 mm. long, bifid with slender teeth, the lower reflexing, tridentate, 7–8 mm. long; banner suborbiculate, nearly glabrous, the wings about 5 mm. long, the keel eciliate.—Suggests according to Smith *L. laxiflorus* and relatives of northwestern North America; resembles vegetatively *L. Albertsmithianus* but the apex of banner is not widely reflexed.

Junín: Huacapistana, open hillsides, *Killip & Smith 24237*, type.

Lupinus Dorae C. P. Smith, Sp. Lupin. 271. 1941.

Low, branched shrub, the minutely appressed pubescent prostrate stems 4–8 cm. long; stipules 1–2 mm. long; petioles 10–15 mm. long; leaflets 5–9, broadly oblanceolate, obtuse, conduplicate, to 5 mm. long, about 1 mm. broad; peduncles 2–5 cm. long, slender, the erect racemes 4–6 cm. long with 5–7 distinct verticils; bracts 3 mm. long, lanceolate, deciduous, the pedicels scarcely a third as long; flowers about 10 mm. long; calyces green but appressed white sericeous, the upper lip bifid, 2–3 mm. long, the subequal lower entire or minutely tridentate; banner suborbiculate, yellow medially and apically,

the wings to 4 mm. broad, the keel as to type ciliolate; pods (immature) 12 mm. long, 4 mm. broad, appressed-sericeous.—Apparently resembles *L. Gilbertianus*, the keel typically eciliate, or the Vargas collections could be referred there as they, at least, are doubtfully separable.

Apurímac: Prov. Abancay, in puna, 4,000 meters, *Vargas 9815* (det. Standl., *L. microphyllus*).—Cuzco: Sulcán, 4,000 meters, *Vargas 885* (det. Standl., *L. microphyllus*).—Puno: Santa Rosa, (*Dora Stafford 307*, type).

Lupinus Ellsworthianus C. P. Smith, Sp. Lupin. 159. 1940.

Erect shrub 6–9 dm. high, the slender suberect stems minutely appressed pubescent; stipules 5 mm. long; petioles slender, 3–5 cm. long with oblong-oblanceolate obtuse mucronulate leaflets, glabrous above, subsericeous beneath to 3.5 cm. long, 10 mm. broad; peduncles 6–8 cm. long, the much longer racemes with 12 or more verticils; bracts persisting, subulate, 4–6 mm. long; pedicels 2–4 mm. long, densely appressed-pubescent; flowers 10–12 mm. long, the laxly appressed-sericeous calyces with upper lip bidentate; banner pubescent near the white tip, medially yellow, the wings blue, the keel greenish-white, ciliolate; ovules 6; pods to 4 cm. long, 10 cm. broad, the seeds 5 mm. long, 3 mm. broad.—Name originally spelled *"Elsworthianus,"* no doubt by typographical error, and therefore to be corrected. Cf. *L. Albertsmithianus.*

Junín: Carpapata, above Huacapistana, open hillside, *Ellsworth P. Killip & A. C. Smith 24338*, type.

Lupinus eriocladus Ulbrich, Bot. Jahrb. 37: 549. 1906; 177. *L. punensis* C. P. Smith, Sp. Lupin. 177. 1940.

Shrub 6–8 dm. high, the branches and leaflets both sides densely tomentose-villous, the trichomes at least in part spreading; stipules 5–8 mm. long; petioles 1–1.5 (2) cm. long; leaflets broadly elliptic, flat, to 2 cm. long, 9 mm. broad; peduncles short, the elongate racemes rather laxly flowered; bracts about 7 mm. long, subpersisting; pedicels 5–8 mm. long, spreading-pubescent; flowers about 13 mm. long, the calyces laxly pubescent, the upper lip bidentate, 4–5 mm. long, the lower entire, about as long; banner suborbiculate, pubescent, the wings 6 mm. broad, the keel eciliate; ovules 4–6; pods to 2 cm. long, about 6 mm. broad, densely subappressed-villous.—The pubescence is less spreading on the Soukup specimens. F.M. Neg. 1984.

Arequipa: Near Airampal, 3,000 meters, *Weberbauer 1397*, type; 130.—Puno: Orurillo, *Soukup 578*. Araranca, 4,100 meters, *Cook & Gilbert 184* (type, *L. punensis*).

Lupinus exochus C. P. Smith, Sp. Lupin. 291. 1941.

Erect branching shrub to 12 dm. high, the slender solid stems subsericeous, the numerous leaves green but sericeous-pubescent both sides; stipules 1.5–2 cm. long; petioles becoming 4–6 cm. long; leaflets 6–7, oblanceolate, acute, the larger flat, 4–6 cm. long, 7 mm. broad; peduncles to 8 cm. long, the racemes to twice as long with 6 or 7 distinct verticils; bracts oblong-aristate, deciduous; flowers about 16 mm. long; both calyx lips entire, the upper nearly 7 mm. long, the lower 10–12 mm. long; banner suborbiculate, pubescent, the wings about 7 mm. broad, the keel eciliate.

Lima: Río Blanco, open hillsides, *Killip & Smith 21724*, type; also *21582* and *21727*.

Lupinus Fieldii Rose ex Macbr. Field Mus. Bot. 8: 94. 1930; 267. *L. yaulyensis* C. P. Smith, Sp. Lupin. 264. 1941(?).

Herbaceous perennial, the peduncles terminal on short stout tufted densely leafy stems, at least the exterior prostrate-ascending; pubescence of the stems, petioles and peduncles densely villous-tomentose, that of the leaflets appressed-sericeous on both surfaces; petioles to about 1 dm. long; leaflets mostly 9–11, to 4 cm. long, 6 mm. broad, oblanceolate; racemes to 2 dm. long, the persisting bracts ovate at base, caudately subulate, shortly villous, 6–8 mm. long; pedicels 1.5–2 mm. long; upper calyx lip bifid, the divisions about 4 mm. long, the lower entire or sometimes minutely tridentate; flowers lilac, the banner nearly 12 mm. long, more or less pilose, the wings 3–4 mm. broad, the keel eciliate; pods densely rusty-villous, 2 cm. long, 8 mm. broad.—From description the plant of Smith seems to be a variety, the leaflets 6–8, to 3 cm. long, 5 mm. broad; the author has by typographical error spelled the name "*yanlyensis*"; he also cites the well-known locality as "Yanli." The plant was dedicated to Marshall Field, who financed the expedition upon which it was obtained. The fragrant flowers are a light pink-purple, the banner with a yellow blotch, the foliage ill-scented.

Junín: Near Yauli, small lake, (*Weberbauer 351*, type, *L. yaulyensis;* also *2576*). Morococha, steep short-grass slope, 4,000 meters, *876*, type.

Lupinus Franciswhittieri C. P. Smith, Sp. Lupin. 282. 1941.

Herbaceous probably short-lived perennial with erect or decumbent more or less villous stems, 2–3 dm. long; stipules 6–10 mm. long; petioles 3–5 cm. long, somewhat villous as the leaflets beneath at least marginally, these glabrous above, narrowly oblanceolate, mostly conduplicate, to 4 cm. long, 8 mm. broad; peduncles 6–10 cm. long, the rather laxly flowered racemes about as long; pedicels 2 mm. long, spreading-pubescent; flowers 10–12 mm. long; calyces appressed-subsericeous, the upper lip bifid, about 3 mm. long, the lower slightly longer, entire, arcuately reflexed; banner suborbiculate, glabrous, the wings 4 mm. broad, the keel eciliate.—The author described the plant as annual or biennial, writing the name "*Francis-Whittieri.*" He refers here my *4079* with nodose roots, which is probably *L. Lindleyanus.*

Cuzco: Cerro de Cusilluyoc, 3,000 meters, *Francis Whittier Pennell 14114*, type; *14116*.

Lupinus Gaudichaudianus C. P. Smith, Sp. Lupin. 289. 1941.

Annual, erect, branched above the base, 2–4 dm. high, the thick subfistulose stems strongly nervose, lanuginose and villous; petioles 3–8 cm. long; leaflets 7–9, to 3 cm. long, 7 mm. broad, oblanceolate, acute or obtuse, flat, glabrous above, glabrate beneath; pedicels 3–6 cm. long, the racemes about as long; bracts typically deciduous, 5–6 mm. long, villous as the half as long pedicels; flowers 8–12 mm. long; upper calyx lip 3–5 mm. long, bidentate, the slightly longer lower one entire; banner suborbicular, glabrous, the wings 5–6 mm. broad, the keel ciliate.—The var. *Martinetianus* C. P. Smith has lanuginose and sublanate stems, persisting bracts. The author records with doubt the locality of the Martinet specimen as "Chola" but no such place is listed in Stiglich, Diccionario Geografico del Peru, Lima, 1922.

Lima: Callao, (*Gaudichaud*, type). Locality doubtful, (*Martinet 327*, type, var.).

Lupinus Gayanus C. P. Smith, Sp. Lupin. 173. 1940.

Shrub with slender minutely tomentose appressed-subsericeous stems, the internodes about 3 cm. long; leaflets densely silvery sericeous both sides, sublanceolate, rounded at tip, mucronulate, flat, 4.5 cm. long, 12 mm. broad; petioles about 4 cm. long; stipules 8–10 mm. long; peduncles to 6 cm. long, the racemes twice as long or longer with many verticils; bracts lanceolate, 5 mm. long, cadu-

cous; pedicels appressed-pubescent, 4–6 mm. long; flowers about 14 mm. long; upper calyx lip bidentate, 4 mm. long, the lower entire, 6 mm. long; banner suborbiculate, obscurely and sparsely pubescent near tip, the wings broad, the keel eciliate.—Apparently scarcely distinct from *L. Ulbrichianus*.

Cuzco: Locality unknown, (*Gay*, type).

Lupinus Gilbertianus C. P. Smith, Sp. Lupin. 276. 1941. *L. subumbellatus* C. P. Smith, l.c. 270. 1941.

Low somewhat suffruticose perennial, the slender decumbent or suberect stems sometimes about 1 dm. long, glabrate or early slightly appressed strigose; petioles filiform, 1–3.5 cm. long, sometimes persisting after the leaflets fall, these to 12 mm. long, 3 mm. broad, in age often flat, glabrate or glabrous at least above, slightly sericeous-pubescent beneath; peduncles 1.5–3 cm. long, the racemes with 1–3 separate or crowded verticils, the usually subsessile flowers 8 (6)–10 mm. long; upper calyx lip bifid, about 3 mm. long, the lower 4 mm. long, entire; keel eciliate; banner obovate; ovules 5 (3–4); pods 12–15 mm. long.—Smith notes that his diagnosis of *L. subumbellatus* is largely from photographs; the flowers are described as only 5–6 mm. long, ovules 3 or 4 but otherwise the characters are essentially the same and Smith himself has cited the type collection under *L. Gilbertianus*, probably an earlier disposition. If distinct from *L. prostratus* the name honoring a collector may be the one retained (granting *L. subumbellatus* is not separable) in spite of page precedence of the latter, this not being significant since the publication date is the same. Cf. also *L. sarmentosus*.

Ancash: Ocros to Paso Chonta, (*Weberbauer 2791*).—Lima: Culnai to Casa Cancha, (*Wilkes Exped.* det. Gray, *L. prostratus*).—Junín: Yauli, (*Weberbauer 340*). La Oroya, *Kalenborn 63*, part. Río Blanco, *798* (det. Smith, *L. chlorolepis;* Rose, *L. prostratus*).—Ayacucho: Pampalca, open hillside, 3,200 meters, (*Killip & Smith 22233*).—Cuzco: Prov. Canas, 3,900 meters, *Vargas 11001* (stems villous, flowers pedicellate). Cerro de Cusilluyoc, 3,500 meters, open grassy slopes, *Pennell 14160* (det. Smith, pedicels 1–2 mm. long).—Puno: Ayapata, (*Lechler 1842*, type). Locality unknown, 4,100 meters, *Weberbauer 6627* (toward *L. chlorolepis*). Without locality, (*Soukup 1176*).

Lupinus Goodspeedii Macbr., spec. nov.

Suffruticosus 1–1.5 m. altus; caulibus conspicue cum pilis patentibus longo-villosis etiam dense sericeo-strigillosis vel lanatis;

stipulis adpresse sericeis anguste lanceolatis acuminatis ad 2 cm. longis; petiolis 2.5–4 cm. longis, longe vaginantibus; foliolis conduplicatis oblongo-lanceolatis acutis ad 4 cm. longis, 6 mm. latis subtus dense adpresseque argenteo-sericeis supra glabratis vel demum glabris; pedunculis ad 1 dm. longis; pedicellis 5–6 mm. longis patente villosis; bracteis caduceis ovato-caudatis fere 10 mm. longis; calycis sericeo-villosis ut videtur ebracteolati labio superiore breviter bidentato 8 mm. longo, inferiore integro reflexo circa 8 mm. longo; floribus fere 15 mm. longis, vexillum valde reflexum leviter pubescens, alae 6–7 mm. latae, carina eciliata.—Apparently, as species have been designated in this genus, not exactly like any form described from Peru, in pubescence perhaps simulating *L. Staffordiae* and *L. Munzianus* but the leaflets glabrous or nearly glabrous above as in *L. paniculatus* and its related forms or races.

Found along stone walls (the flowers dark blue, the banner with a golden yellow area) by the collectors associated with Dr. T. H. Goodspeed, the well-known Director of the Botanical Garden of the University of California, whose book "Plant Hunters in the Andes" describes, botanically and otherwise, the Peruvian scene, the locality of this Lupine, pages 52–54.

Libertad: Santiago de Chuco, 3,150 meters, *Stork & Horton 9944*, type.

Lupinus hamaticalyx C. P. Smith, Sp. Lupin. 166. 1940.

Branched shrub, the stems minutely appressed-pubescent, the numerous green leaves glabrous above, scarcely subsericeous beneath; stipules only 2–3 mm. long; petioles filiform, appressed-pubescent, 1.5–2.5 cm. long, with 5–6 cuneate or oblanceolate acute, obtuse and apiculate leaflets, 1.5 cm. long, 5 mm. broad; peduncles slender, the somewhat longer racemes with 3–5 distinct verticils; bracts linear, 5 mm. long, deciduous; pedicels appressed-pubescent, 2–4 mm. long; flowers 12–14 mm. long; lower calyx lip entire, 5–7 mm. long, in anthesis incurved over the upper lip, this bidentate, 4–5 mm. long; banner suborbiculate, glabrous, the wings to 6 mm. broad, the keel eciliate.—Description is accompanied by a drawing of the calyx.

Amazonas: Chachapoyas, (*Mathews*, type).

Lupinus Herreranus C. P. Smith, Sp. Lupin. 293. 1941.

Erect branched shrub to several dm. high, the slender stems appressed sericeous as the leaflets on both sides, these oblanceolate,

obtuse, to 2.5 cm. long in type, 4–5 mm. wide, conduplicate; petioles 2–3.5 cm. long; stipules to 8 mm. long, linear; peduncles 5–8 cm. long, the racemes as long; bracts aristate, 6–8 mm. long, deciduous; pedicels 4–5 mm. long, appressed sericeous; flowers 10–12 mm. long; upper calyx tooth bidentate, about 4 mm. long, the lower entire, 5–6 mm. long; banner densely pilose near tip with medial yellow spot, the keel eciliate; ovules 5 or 6; pods 3–3.5 cm. long, 8 mm. broad, densely villous.

Cuzco: Urubamba Valley, Hacienda Fanccac, 2,760 meters, *Herrera 2093*, type.

Lupinus Hinkleyorum C. P. Smith, Sp. Lupin. 182. 1940.

Erect, branched, several dm. high, the slender solid stems, petioles and leaves strikingly villous, the trichomes widely divaricate; stipules 8–10 mm. long; petioles 3–4 cm. long with 5–8 oblong linear acute leaflets, to 22 mm. long, 4 mm. broad; peduncles to 5 cm. long, the much longer racemes with 10–12 verticils of blue flowers, these about 12 mm. long; bracts about 6 mm. long, ovate-lanceolate, aristate; pedicels 4–6 mm. long, spreading-pubescent as the calyces, the ovate upper lip of these bidentate, 3 mm. long, the lower entire, 5 mm. long; banner suborbiculate, pubescent near tip, the wings broad, the keel eciliate.—Perhaps allied to *L. bracteolaris* Desr. of southern South America and *L. tominensis* Wedd. Chlor. And. 2: 251. 1857 of Bolivia if distinct from the latter.

Arequipa: Chachaní Mountain, 2,440 meters, (*Mr. & Mrs. F. E. Hinkley 12*, type). Near Arequipa, *Werner Hopp 17*. "Esquera."

Lupinus Hornemanni Agardh, Syn. Gen. Lupin. 22. 1835; 157.

Suffrutescent, tall, the branches soon glabrous or early finely spreading puberulent as the leaflets beneath, these 7–10, narrowly oblanceolate, acute, to 6.5 cm. long, 10 mm. broad, glabrous above, the minutely sublanate petioles 7–10 cm. long; stipules deciduous, free, subulate, 3–7 mm. long; peduncles about 1 dm. long, the racemes 2 to 3 times longer with more than 10 verticils; bracts subulate, deciduous, to about 15 mm. long, the pedicels 7–10 mm. long, densely sublanate; flowers about 17 mm. long; upper calyx lip bidentate to 8 mm. long, the lower entire, about 10 mm. long; banner pubescent, the wings 10 mm. broad, the keel eciliate.—Agardh described the plant as herbaceous, the pods as densely tomentose. My *3949*, less pubescent, scarcely woody below, was included by Smith in *L. Macbrideanus;* it is probably distinct.

Weberbauer 5573, determined by Smith as *L. Wilkesianus*, seems to be a more puberulent-villous state of this species or is possibly separable. *L. pendentiflorus* C. P. Smith, 158, presumably of Ecuador, is apparently similar but the pedicels are "minutely appressed-pubescent." *L. semperflorens* Hartw. of Ecuador has pubescent banner, bracteolate calyx, short bracts, more pubescent leaflets; *L. arvensis* Benth., also Ecuadorean, has smaller leaflets, densely sericeous beneath and much shorter pedicels.

Huánuco: Muña, sunny brush lands, *3949*.—Junín: Paltarumi, Prov. Huancayo, (*Mathews 923*, type).—Ayacucho: Near Huanta, *Killip & Smith 22345*. Tambo to Río Apurímac, *Weberbauer 5573*. Huanacabra, (*Mathews 922*).—Cuzco: Hills of Saxaihuamán, (*Herrera 730*). Near Cuzco, (*Weberbauer 4853; Seler 177; Herrera 57*, in part, this number also *L. alimanens*). Cerro de Cusilluyoc, *Pennell 13892; 14113*. Ecuador.

Lupinus huaronensis Macbr. Field Mus. Bot. 8: 95. 1930; 261.

With the habit of *L. Weberbaueri* but somewhat smaller and the villous trichomes shorter or nearly lacking; leaflets 8–13, the larger about 5 cm. long, 1 cm. broad, green but moderately appressed-pilose both sides; petioles 1–1.5 dm. long, short-pubescent; stipules about 1.5 cm. long; peduncles more or less developed, sometimes leafy, continuing from the stem, the racemes 2–2.5 dm. long; bracts linear-subulate, 12 mm. long; pedicels 2–3 mm. long; upper calyx lip deeply bifid, the lower entire or emarginate, nearly 8 mm. long; flowers to 14 mm. long, the white banner glabrous, shortly exceeded by the deep lilac keel and petal, the former eciliate; pods softly villous, 15 mm. long, about 10 mm. broad.—The var. *pascoensis*, l.c. 96, has stipules 3.5 cm. long, bracts 15–17 mm. long, the lower calyx lip tridentate, the flowers paler. Smith remarks that he had originally included this form with the type, which is probably the correct disposition, the variation being inconsequential. *L. Herzogii* Ulbrich, Meded. Rijks Herb. Leiden 27: 45. 1915, Bolivian, might be sought here; it has 7 linear-lanceolate leaflets, about 4 cm. long, 5 mm. broad, and seems to be very closely related.

Junín: Baños, (*Wilkes Exped.* fide Smith). Huarón, *1141*, type. La Oroya, (*Kalenborn 63A*). Near Huancayo, 4,700 meters, *Killip & Smith 22071*. Cerro de Pasco, *3056*, type, var.

Lupinus Jelskianus C. P. Smith, Sp. Lupin. 175. 1940.

Shrub, the branches more or less nodose below the current leaves, these abundant, silvery-sericeous, especially beneath (or in dried

specimens the trichomes fulvous); stipules sericeous, 10–15 mm. long; petioles rarely 2.5 cm. long with 6–8 oblanceolate acutely cuspidate leaflets, the larger to 17 cm. long, 4 mm. broad; peduncles 2–3 cm. long, the racemes probably not much longer; bracts deciduous, linear-aristate, 10–15 mm. long, conspicuous above the buds; pedicels appressed-pubescent, 2–3 mm. long; flowers probably about 12 mm. long; bractlets 2 mm. long; upper calyx lip entire, 7–8 mm. long; banner suborbiculate, pubescent near the tip, apparently 10 mm. broad.—The type has only incompletely developed flowers. Szyszylowicz had indicated it in herb. as a new variety of *L. paniculatus*. My *1555* referred by Smith to his *L. Holwayorum* apparently rather belongs here because the calyx lips are both entire. F.M. Neg. 1994.

Cajamarca: Vicinity of Cutervo, *Jelski 211*, type.—Huánuco: Mito, sunny rocky slope, *1555* (det. Smith, *L. Holwayorum*).—Lima: Chicla, *Rose & Rose 18682* (det. Smith, *L. Holwayorum*).

Lupinus juninensis C. P. Smith, Sp. Lupin. 278. 1941.

Half shrub, the more or less herbaceous subsericeous branchlets lax or spreading, the long (4–6 cm.) petioled leaves green but minutely appressed-sericeous both sides; leaflets 5–7, oblong-elliptic, rounded at tip or subacute, to 4 cm. long, 10 mm. broad; peduncles 6–10 cm. long, the racemes a little longer with many more or less remote verticils; bracts narrowly lanceolate, promptly caducous, 3 mm. long; pedicels 1–2 mm. long, spreading villous; flowers about 11 mm. long, the calyces subappressed-sericeous with upper lip bifid, about 4 mm. long, the lower entire, 5–6 mm. long; banner pubescent, the wings broad, the keel eciliate or ciliate; ovules 5; pods 2.5 cm. long, 5 mm. broad, subappressed-pubescent, the seeds 3 mm. long, 2 mm. broad, whitish with purplish marks and a poorly defined darker diagonal line.—As most of my collections, the species had been given a herbarium name by Rose.

Huánuco: Yanahuanca, shrubby slopes, *1169*.—Junín: Huariaca, 3,000 meters, *3119*, type. Locality unknown, (*Boyd Ehle*).

Lupinus Kalenbornorum C. P. Smith, Sp. Lupin. 266. 1941.

Erect herbaceous perennial, several dm. high, the rather slender but fistulose stems inconspicuously appressed-pubescent with many short and a few longer trichomes; upper petioles (the lower unknown) 4–12 cm. long; leaflets 7–9, to 5 cm. long, 5 mm. broad, oblanceolate, acute, flat, green and glabrate above, subsericeous beneath; pe-

duncles 3 cm. long, somewhat lanate, the racemes 1.5–2 dm. long with 12–15 rather crowded verticils; bracts lanceolate, 4–5 mm. long, persisting; pedicels 1–2 mm. long, spreading-pubescent; flowers about 15 mm. long, the densely appressed-sericeous calyx with upper bifid lip, the lanceolate teeth 4 mm. long, the subequal lower lip entire; banner ovate, reflexed, about as long as the wings, these 4–5 mm. broad, the keel eciliate.—Killip has called my attention to the fact that the type number is cited by Smith also under *L. chlorolepis*, which as to sheet in U. S. National Herbarium it appears to be, judging from a scrap of that sheet which I have seen.

Junín: La Oroya, (*Margaret & A. S. Kalenborn 63*, type).

Lupinus Lechlerianus C. P. Smith, Sp. Lupin. 184. 1940.

Herbaceous perennial or the numerous stems subligneous toward the base, the short branches erect, subappressed-sericeous with minute and some longer trichomes intermixed; stipules 5–6 mm. long; petioles several to 7.5 cm. long with 5–7 flat oblong linear or slightly oblanceolate acute leaflets, glabrate above, more or less densely appressed-sericeous beneath, 1.5–2.5 cm. long, 3 mm. broad; peduncles 3–6 cm. long, the racemes about as long with 3–5 distinct verticils; bracts persisting, lanceolate, 3–5 mm. long, the pedicels 4–6 mm. long, subappressed-pubescent; flowers 6–8 mm. long; both calyx lips entire, the upper 2 mm., the lower 3 mm. long; banner suborbiculate, sericeous-pubescent, the wings about 4 mm. broad, the keel eciliate; ovules 3; pods 14 mm. long, 4 mm. broad, laxly but densely sericeous.—The plant well developed forms dense clumps. Nearly *L. Bangii* Rusby (see *L. Oquendoanus*) unless for the longer pedicels.

Puno: Cordillera de Puno, (*Lechler 1714*, type).—Arequipa: North of Salamanca, 4,100 meters, *Weberbauer 6852*.

Lupinus Ledigianus C. P. Smith, Sp. Lupin. 294. 1941.

Much branched silvery-pubescent shrub to 12 dm. high; stipules about 10 mm. long; petioles 1.5–2 cm. long, slender, with 6–8 acute or obtuse linear-oblanceolate mostly conduplicate leaflets, the larger 2 cm. long, 3 mm. broad; peduncles to 3 cm. long, the racemes 4–8 cm. long with 4–6 crowded verticils; bracts ovate, long-aristate, more or less promptly deciduous, to 8 mm. long; pedicels 5–7 mm. long, the dense soft pubescence spreading; flowers about 14 mm. long, the calyces velutinous, both lips entire, the upper 5–6 mm., the lower 6–8 mm. long; banner suborbiculate, velutinous dorsally, the wings

6–8 mm. broad, the keel eciliate; pods probably 3 cm. long or longer, 10 mm. broad, velutinous.—Resembles *L. brachypremnon*, *L. tarapacensis*, close relatives or forms of *L. tomentosus*.

Junín: Acopalca Canyon, Huancayo, dry hillside, *Paul Ledig 20*, type.

Lupinus Lindleyanus Agardh, Syn. Gen. Lupin. 9. 1835; 283. *L. matucanicus* Ulbrich, Notizbl. Bot. Gart. Berlin 7: 452. 1920; 272.

Erect or suberect annual 2–6 dm. high, the more or less fistulose villous stems usually branched; petioles 3–8 cm. long; leaflets typically 8–9, to 3 or 4 cm. long, 4–8 mm. broad, oblanceolate, acute, flat, glabrous above, somewhat pilose beneath; peduncles 3–5 cm. long, the racemes twice as long, scarcely exceeding the leaves; bracts 5–10 mm. long, linear, rather promptly caducous, loosely villous as pedicels, these 1–2 mm. long; flowers 8–12 mm. long; upper calyx lip 3–4 mm. long, bifid, the slightly longer lower one entire or minutely tridentate; banner suborbicular, glabrous, the wings 3–4 mm. broad, the keel ciliate; ovules 4–6; pods 3–4.5 cm. long, about 9 mm. broad. —*Mathews 921* according to Smith is in some herbaria a variety of *L. matucanicus;* it seems probable that only one somewhat variable species is concerned and the description has been modified to include *L. matucanicus* which represents specimens with leaflets to 4 mm. wide, ovules 4–5. As Smith suggests, the plant is not clearly distinct specifically from *L. bicolor* Lindl. of California. An extreme of *L. Lindleyanus* is var. **fistulosus** (C. P. Smith) Macbr., comb. nov. (*L. matucanicus* var. *fistulosus* C. P. Smith, l.c. 273), leaflets 6–11, to 4 cm. long, 6 mm. broad, ovules 6.

Lima: Lurín, (*Mathews 921*). Near Lima, (*Cuming 969; 992*, type). Below Obrajillo, *Wilkes Exped.*—Huánuco: Yanahuanca, *1291*(?) (det. Smith, *L. chlorolepis*). Muña, *4079* (det. Smith, *L. Franciswhittieri*).—Huancavelica: Below Colcabamba, 2,200 meters, *Weberbauer 6442*, var.

Lupinus Lobbianus C. P. Smith, Sp. Lupin. 179. 1940.

Low shrub, the slender stems inconspicuously appressed-sericeous, the many leaves glabrous above, subsericeous beneath; stipules to 10 mm. long; petioles 4–6 cm. long, with 5–7 linear very acute leaflets, the older flat, to nearly 3 cm. long, 3 mm. broad; peduncles to 3 cm. long, the racemes to 12 cm. long with 6 distinct verticils; bracts linear-subulate to 12 mm. long, persisting; pedicels 2–3 mm. long, spreading-pubescent; flowers about 13 mm. long; calyces

appressed-sericeous, the upper lip bidentate, 6 mm. long, the lower subarcuate, nearly or quite as long; banner suborbiculate, pubescent near tip, the wings 5 mm. broad, the keel eciliate.—Named for William Lobb of England who died in San Francisco in 1863; his itinerary being imperfectly known, the species may not be Peruvian.

Peru(?): Locality unknown, (*Lobb*, type).

Lupinus lorenzensis C. P. Smith, Sp. Lupin. 280. 1941.

An erect unbranched annual, 2–4 dm. high, the slender solid stem spreading-villous; petioles 4–8 cm. long; leaflets 8–11, to 3.5 cm. long, 6 mm. broad, oblanceolate or spathulate, flat, glabrate above, somewhat villous beneath; peduncles 3–5 cm. long, the slightly longer racemes not or barely exceeding the leaves; bracts deciduous or subpersisting; pedicels 2 mm. long; flowers 8–12 mm. long, scarcely verticillate; upper calyx lip bifid or cleft, 2–3 mm. long, the lower obscurely tridentate; banner suborbiculate, glabrous, the wings 3–5 mm. broad, the keel densely ciliate medially to tip.

Lima: San Lorenzo and Lima, (*Gaudichaud*, type).

Lupinus Macbrideanus C. P. Smith, Sp. Lupin. 159. 1940.

Arborescent at least in age, the hollow branchlets soon glabrate; stipules lanceolate, long-aristate, to 7 mm. long; petioles 1–2 cm. long, with 5–7 oblong-elliptic leaflets, rounded at tip, obscurely mucronate, to 2.5 cm. long, 7 mm. broad, dark green and glabrous above, paler and finely appressed-sericeous beneath, glabrate in age; peduncles a cm. or two long, subappressed-strigose, the racemes 2 or 3 times longer with about 6 poorly defined verticils; bracts lanceolate-aristate, 6 mm. long, caducous; pedicels 3, scarcely 4 mm. long, subappressed-pubescent; flowers 12 mm. long; calyces appressed-sericeous, the shortly bidentate upper lip 5 mm. long, the narrower lower one to 7 mm. long, entire; banner suborbiculate, lightly pubescent near the tip, medially white, the wings about 5 mm. broad, the keel eciliate; ovules 4 or 5; pods to 4 cm. long, 1 cm. broad, finely and scarcely densely appressed-sericeous, the seeds 6 mm. long, 4 mm. broad, deep brown with a few paler blotches and one dark line on each side below the middle.—This description is from the original collection in Field Museum; the author includes here, perhaps rightly, my *3949* from Muña with the habit and appearance of *L. mutabilis*, scarcely woody even at base, the petioles 6–8 cm. long; leaflets to 5 cm. long, 15 mm. broad, merely puberulent beneath, the racemes elongate, the verticils remote, the pedicels at

least 5 mm. long, the short pubescence spreading, the pods to 4 cm. long, 12 mm. wide, the seeds 6 mm. long, 5 mm. broad, the upper half brownish, densely mottled with white, the lower portion dark-colored; it seems to me to belong to *L. Hornemanni* but these differences of course may be included within the range of variation of the species if distinct. Type was tree-like, about 2 meters high. The name was spelled by the author "*Macbrideianus*," corrected however as above by him l.c. 288 and also in his key.

Huánuco: Cani, near Mito, edge of stream thicket, *3464*, type.—Junín: Huacapistana, (*Weberbauer 1965*).—Puno: Sandía, (*Weberbauer 673*).

Lupinus malacotrichus C. P. Smith, Sp. Lupin. 263. 1941.

Apparently from description scarcely distinguishable from *L. Kalenbornorum* and like it very similar to *L. Fieldii*, but the inflorescence pubescence appressed-sericeous, that of the pedicels laxly so; leaflets to 4 cm. long, 7 mm. broad (or much larger?); peduncles 6–8 cm. long, the racemes somewhat longer; banner suborbiculate, about 10 mm. broad, densely pubescent above the middle; ovules 3 or 4; pods 2 cm. long, 7 mm. broad, closely reddish-yellow villous.—The author suggests the locality as probably "Huaytara" in Huancavelica. Here would key *Herrera 2335* which however has petioles to 2 dm. long, leaflets to 6 cm. long, 15 mm. wide, banner less pubescent.

Peru (?): Cordillera Huagahara, 4,000 meters, (*Pearce*, type).—Cuzco: Hacienda Lauramarca, Valle del Paucartambo, 4,600 meters, *Herrera 2335* (cf. note above). "Quera-quera" (Herrera).

Lupinus Mathewsianus C. P. Smith, Sp. Lupin. 162. 1940.

Shrub, a few dm. high, the woody stems minutely appressed-pubescent; stipules subulate, 2–3 mm. long; petioles filiform with 5–6 cuneate-oblanceolate obtuse but strongly apiculate leaflets, 15–18 mm. long, glabrate above, subsericeous beneath; peduncles 2–4 cm. long, the racemes 3–10 cm. long with 5–6 widely separated verticils; bracts deciduous or subpersisting, lanceolate, 5–6 mm. long, scarcely longer than the slender laxly appressed-sericeous pedicels; flowers 14 mm. long; upper calyx lip bidentate, 3–4 mm. long, the lower entire, deflexing, arcuate; banner glabrous, suborbiculate, about 10 mm. broad, the wings half as broad, the keel ciliolate.

Amazonas: Chachapoyas, (*Mathews*, type).

Lupinus microcarpus Sims, Bot. Mag. 50: *pl. 2413*. 1823; 193.

Low annual 6–15 cm. high, branched at or near the base, the short stems spreading-villous; petioles 3–8 cm. long, villous to glabrate; leaflets 7–9, glabrous above, somewhat villous beneath, oblanceolate, acute, conduplicate; peduncles 1–5 cm. long, the racemes 3–7 cm. long, equaling or exceeding the leaves with 2–7 verticils; bracts 5–6 mm. long, persisting; pedicels 1–2 mm. long, spreading-pubescent; flowers 7–12 mm. long; upper calyx lip bidentate, nearly 2 mm. long, the lower bi- or tridentate, 6–7 mm. long; banner glabrous, lanceolate, usually acute, the wings narrow, the keel ciliate; ovules 2; pods 10–15 mm. long, ovate, pubescent.—The following collection determined by Smith is noteworthy as an example of a common Chilean and Californian species occurring in central Peru.

Lima: Between Matucana and Chanpothio, (*Weberbauer 148;* 169). Chile; California.

Lupinus microphyllus Desr. in Lam. Encycl. 3: 625. 1791.

Depressed shrub, the more or less ligneous stems and branchlets prostrate, forming rather loose mats and tangled in the accompanying turf; flowering stems including the short or subcapitate racemes commonly a few to 10 cm. long, the peduncles 1.5–3 cm. long, more or less densely appressed-sericeous, this pubescence extending to the calyces, these with upper lip bifid, lower entire; petioles 5–8 mm. long; leaflets ordinarily 7–9, linear, conduplicate, usually 3–7 mm. long, scarcely more than half a mm. broad, green but usually with a few appressed trichomes, especially at the acute tips; bracts lanceolate, persisting, about 3 mm. long; flowers subsessile, to 7 mm. long, the banner glabrous, obovate, the wings scarcely 3 mm. broad, the keel eciliate; pods oval, acuminate, slightly sericeous-tomentose, 12–16 mm. long.—Type said to have been obtained in Peru but apparently the species in typical form is known only from Ecuador where the collector may well have obtained his specimen. Here would be sought because of its small flowers *L. humifusus* Benth. Pl. Hartw. 169. 1857, but it has the habit and loose pubescence and broader leaflets of *L. prostratus* et rels. F.M. Neg. 28154.

Junín: Mount La Juntay, near Huancayo, 4,700 meters, *Killip & Smith 22042*.—Huancavelica: West of Huancavelica, in puna, 3,900 meters, *Stork & Horton 10847*. Locality unknown (cf. note above), *Joseph de Jussieu*, type. Ecuador.

Lupinus misticola Ulbrich, Notizbl. Bot. Gart. Berlin 7: 453. 1920; 285.

Herbaceous perennial a few dm. high, the short fleshy fistulose minutely appressed stems tufted and assurgent-ascending as in related species; petioles mostly 1–2 dm. long; leaflets 8–10, to 5 cm. long, 7 mm. broad, narrowly oblanceolate, at least the larger flat, glabrous above, rather sparsely appressed-sericeous-villous beneath; peduncles or stems becoming 2 dm. long, the densely flowered racemes 10–15 cm. long; bracts persisting, 5 mm. long; pedicels 4–8 mm. long, shortly spreading villous; flowers 12 mm. long; upper calyx lip 3 mm. long, entire, the slightly longer lower ones sometimes minutely tridentate; petals blue, the reflexed banner medially yellow, pubescent dorsally, the wings 7–8 mm. broad, the keel eciliate.—Related to *L. polyphyllus* Lindl. of North America (Smith). F.M. Neg. 1990.

Arequipa: Mt. Misti, sandy bunchgrass formation, *Weberbauer 1423*, type.

Lupinus mollendoensis Ulbrich, Bot. Jahrb. 37: 547. 1906; 278.

Annual, a few to 10 cm. high, the slender erect stems with few if any branches, densely villous with long spreading trichomes, these extending to the petioles and obovate leaflets especially beneath; petioles 2.5–4 cm. long, the 8–11 obtuse leaflets to 15 mm. long, 4 mm. broad; peduncles short, the racemes 1–2 cm. long with 2 to few flowers, these 9–11 mm. long on pedicels 2–3 mm. long; upper calyx lip bifid, about 3 mm. long, the lower entire, 4–5 mm. long; banner obcordate, emarginate, glabrous, strongly reflexed, the wings 4 mm. broad, the keel eciliate; ovules 4 or 5; pods 2.5 cm. long, 5–6 mm. broad.—Species with facies of *L. microcarpus* but with fewer flowers; a member of the "Micranthus Group" according to Smith. F.M. Neg. 1991.

Arequipa: In the lower lomas near Mollendo, *Weberbauer 1494*, type; 94, 144; (*Stafford K22; 301*); *Worth & Morrison 15763*.

Lupinus montanus HBK. Nov. Gen. & Sp. 6: 478. 1824; 42.

Erect perennial to 8 dm. high, the fleshy fistulose nervose stems 6–10 mm. thick, glabrate or slightly lanate; stipules 5–9 cm. long, the adnate portion 6–10 mm. broad, the free triangular tip 7–10 mm. long; petioles 10–15 cm. long, with 8–15 linear-oblanceolate leaflets to 12 cm. long, 12 mm. broad; peduncles 5–20 cm. long, the racemes about as long; bracts lanceolate, to 2 cm. long, 5 mm. broad,

deciduous; pedicels 5–10 mm. long, spreading-pubescent; flowers about 15 mm. long; calyx lips lanceolate, acute, entire, the upper 5 mm., the lower 6 mm. long; banner glabrous, suborbiculate or narrower, the wing 5–9 mm. broad, the keel eciliate; ovules 7–8; pods 4–5 cm. long, about 1 cm. broad, villous or finally glabrate, the seeds about 4 mm. long, 3 mm. broad.—The Peruvian plant according to Smith, l.c. 285, is var. *austrovolcanicum* C. P. Smith, l.c. 90, the stems slenderer, the leaflets much smaller, at most 5 cm. long, the flowers 10–13 mm. long. Courtesy of Dr. Killip, I have seen a scrap and photograph of the Peruvian collection by Dr. Ales Hrdlička who has kindly written me that the locality San Damián is near Matucana and that the species unquestionably is Peruvian since in 1913 his botanical collections were only from there. This therefore is another example of a species from Central America being found in Peru.

Lima: Vicinity of San Damián, 2,400 to 3,000 meters, Jan. to Feb. 1913, *A. Hrdlička.* Central America.

Lupinus Munzianus C. P. Smith, Sp. Lupin. 143. 1940.

Two to 4 dm. high, the simple or branched stems conspicuously villous with long spreading trichomes; stipules 8–12 mm. long; petioles 2–4 cm. long, with 7–9 conduplicate acute leaflets to 2–5 cm. long, 4 mm. broad, appressed-villous-sericeous both sides; peduncles to 1.5 dm. long, equaled by the many-flowered racemes; bracts persisting or tardily deciduous, to 10 mm. long; pedicels spreading-pubescent, 4–5 mm. long; upper calyx lip appressed-sericeous, 3 mm. long, the lower densely villous, arcuately deflexed, to 5 mm. long; banner broader than long, pubescent, the wings 5–6 mm. broad, the keel eciliate; ovules 4–8.

Arequipa: Quebrada de San Lazaro, above Arequipa, sandy bar, *Munz 15524*, type.

Lupinus mutabilis Sweet, Brit. Fl. Gard. 1, pt. 2: 130. 1825.

Erect annual with stout more or less fistulose glabrous or glabrate stems, branched above, often 10–15 dm. high; stipules deciduous; petioles 4–8 cm. long; leaflets 6–8, oblanceolate, rounded or obtuse or sometimes acute at tip, flat, glabrous or nearly both sides, to 6 cm. long, 12 mm. broad; peduncles to 1 dm. long, the racemes as long or twice as long; bracts caducous; pedicels 5–14 mm. long, glabrous or minutely appressed-pubescent; flowers 18–20 mm. long; calyx appressed-sericeous, the lips entire, the upper 7, the lower 8 mm. long; petals blue or white or the banner sometimes medially

yellow more or less dorsally, the wings very broad, the keel typically ciliate; ovules 3–5; pods about 8 cm. long, 16 mm. broad, reticulate-nerved, somewhat appressed-pubescent.—Cultivated for the edible black or white or black and white seeds which are placed in running water for several days before being cooked, or soaked and the first water used as an insecticide and fish poison. Much cultivated and furnishes a food healthful and agreeable (Herrera).

Cajamarca: Above San Pablo, 2,500 meters, *Weberbauer 3844;* 257.—Amazonas: Chachapoyas, (*Mathews 1570*).—Huánuco: Near Huánuco, *1365;* (*Pearce 116*).—Junín: Uspachaca, *1300.* Montaro Valley, *Killip & Smith 22014.* Pasco, Valley of Cainno, (*Cruckshanks,* type, *L. Cruckshanksii*). Palca, (Weberbauer, 248).—Lima: Rio Blanco, 3,000 meters, *Killip & Smith 21564.*—Cuzco: Pisac, 3,800 meters, *Weberbauer 6980.* Ollantaytambo, 2,800 meters, *Cook & Gilbert 767.* Oropeza, *Herrera 901.*—Puno: Valley of Sandía, grass steppe, (Weberbauer, 238). "Tarhui," "chochos."

Lupinus notabilis C. P. Smith, Sp. Lupin. 244. 1941.

Similar to *L. Gayanus* according to the author but leaflets 6–8, pedicels 5–8 mm. long and, especially, flowers 16–20 mm. long, both calyx lips 7–8 mm. long; ovules 5–7; pods immature but 3 cm. long to 10 mm. broad.—The species probably should include also *L. soratensis* Rusby, Bull. N. Y. Bot. Gard. 6: 510. 1910.

Apurímac: Abancay, *Balls 6899,* type.

Lupinus Oquendoanus C. P. Smith, Sp. Lupin. 265. 1941.

Herbaceous perennial, tufted, the outer stems or branches decumbent, all fleshy fistulose, strongly nervose, minutely lanuginose; petioles 6–9 cm. long; leaflets 7–8, about 3 cm. long, 7 mm. broad, oblanceolate, acute, flat or conduplicate, glabrate above or subsericeous as also beneath; peduncles 4–5 cm. long; racemes 10–15 cm. long, exceeding the leaves; bracts 3–5 mm. long, deciduous, the appressed sericeous pedicels 1 mm. long; flowers 10–12 mm. long; upper calyx lip probably bifid, the lower entire; banner densely pubescent, suborbicular, the wings about 5 mm. broad, the keel ciliate medially to tip.—The author suggests that the species is related to *L. Bangii* Rusby, Mem. Torrey Club 3, no. 3: 17. 1893, of adjacent Bolivia, and, ex character, it seems doubtfully distinct from that species; the habit suggests *L. cymboides.*

Puno: (*Oquendo 9,* type).

Lupinus paniculatus Desr. in Lam. Encycl. 3: 625. 1791; 101.

Shrub with minutely but densely lanuginose branchlets and numerous leaves, glabrous above, finely subsericeous beneath; stipules 3–10 mm. long; petioles 1.5–3 cm. long, the pubescence like the branchlets, spreading; leaflets 5–8, acute or obtuse, narrowly or broadly lanceolate to 2.5 cm. long, about 4 mm. broad; peduncles 2–6 cm. long, the much longer racemes with few-flowered verticils; bracts linear-lanceolate, 5–8 mm. long, deciduous; pedicels 3–4 mm. long, spreading-pubescent; flowers 12–15 mm. long, the upper lanceolate bidentate calyx lip 4 mm. long, the lower entire or minutely dentate, 5–6 mm. long; banner orbiculate, reflexed (fide Smith), the wings broad, the keel eciliate.—Cf. *L. Wilkesianus*. The description as elsewhere after Smith who perhaps has drawn it at least in part from a short-petioled, ciliate-keeled Venezuelan specimen by Pittier which seems to be allied rather to *L. bogotensis* Benth., 161; that species however has petioles ordinarily 4–7 cm. long, keel ciliate. *L. semperflorens* Benth., 158, of Ecuador also has longer petioles; the pedicels of the former species are 3–5 mm. long, those of the latter 8–10.

Amazonas: Chachapoyas, (*Mathews*).—Huancavelica: Gravelly hills north of Pampas, *Goodspeed 10244*.—Cuzco: Yucay, *Soukup 745* (sens. lat.).—Puno: *Soukup 456* (*L. Wilkesianus*, if distinct). Locality unknown, (*Joseph Jussieu*, type; *Lobb 247; Maclean*). "Ckera," "janckas-ckera," "pacha ckera."

Lupinus perblandus C. P. Smith, Sp. Lupin. 169. 1940.

Erect shrub to 12 dm. high, the slender branches inconspicuously appressed-sericeous, the many leaves green but subsericeous above, densely so beneath; stipules to 12 mm. long; petioles 2–3 cm. long with 6–9 linear conduplicate leaflets to 5 cm. long, 4 mm. broad; peduncles to 6 cm. long, the racemes at least twice as long with 10 or more verticils; bracts ovate at base, aristate above to 7 mm. long, more or less persisting; flowers 10–12 mm. long, the appressed-sericeous calyx with entire upper lip, 3–4 mm. long, the entire subequal lower one reflexing; banner suborbiculate, pubescent near tip, the wing to 7 mm. long, the keel eciliate; ovules 5; pods 3 cm. long, 8 mm. broad, yellowish lanate.—Smith suggests that the type locality apparently written "Huaghara" may be "Huaytara;" on the other hand the locality may be in Ecuador.

Huancavelica(?): Huaytara, cf. note above, (*Pearce*, type).

Lupinus peruvianus Ulbrich, Bot. Jahrb. 37: 544. 1906; 275.

Depressed with more or less branched woody caudex, the prostrate-ascending stems and pedicels several to 8 cm. long, subappressed or spreading sericeous-villous; petioles finally 2–3 cm. long; leaflets 5–8, to 2 cm. long, 4 mm. broad, usually considerably smaller, oblanceolate, mostly flat, subappressed-sericeous-villous both sides; racemes 2–4 cm. long, the 3–6 verticils crowded; bracts 5–6 mm. long, deciduous; flowers subsessile, about 10 mm. long; calyces subappressed-villous, the upper lip bifid, 4–5 mm. long, the slightly longer one entire or minutely tridentate; banner ovate-spathulate, glabrous, 8 mm. long, half as broad, suberect, the wings scarcely 3 mm. broad, the keel eciliate; ovules 4.—*Killip & Smith 23352* as to Field Museum specimen has leaflets to 2 cm. long, pubescence mostly appressed and seems to me to be doubtfully referable here. The species apparently is allied to *L. sarmentosus*. F.M. Neg. 1997.

Cajamarca: Above Hualgayoc, 4,000 meters, *Weberbauer 3980*, type.—Amazonas: Chachapoyas, (*Mathews 1569*).—Junín: Near Huancayo, 3,300 meters, *Killip & Smith 23352;* (also *22136* and *Ledig 56*).—Ayacucho: Yanahuara Valley, *Weberbauer 7596*.

Lupinus Pickeringii Gray in U. S. Expl. Exped. Bot. 1: 392. 1854; 268.

Dwarf, depressed, the thick ligneous caudex simple or more or less divided, the entire plant even to the calyces appressed-hirsute-sericeous; petioles 1.5–4 cm. long, slender, more or less appressed-pilose; leaflets 5–7, to 3–7 mm. long, about 3 mm. broad, obovate, the larger flat; peduncles with short subcapitate racemes, scarcely as long as the longer leaves; bracts about 6 mm. long, lanceolate, somewhat persisting; pedicels 1–1.5 mm. long; flowers 5–8 mm. long, the upper lip of the calyx bifid, 3 mm. long, the lower lip entire; banner narrow, as also the wings, the keel eciliate; ovules 3.

Lima: Río Blanco, bunch-grass slopes, *147*.—Junín: Baños and Culnai, *Wilkes Exped.*, type.

Lupinus pinguis Ulbrich, Notizbl. Bot. Gart. Berlin 7: 452. 1920; 262.

Nearly acaulescent, the long-petioled leaves tufted and, at least in the type, exceeding the long-peduncled racemes; pubescence of the stems and petioles sparse, appressed-sericeous, similar but much denser on the leaflets, especially beneath, these 9–12, to 5 cm. long, 10

cm. broad, obtuse but apiculate, flat, the petioles to 2 dm. long; peduncles 5–7 cm. long, fleshy, the racemes as long or somewhat longer; bracts 8–10 mm. long, persisting; flowers 11–12 mm. long; pedicels densely sericeous-hirsute, stout, the lower 3–4 mm. long; upper calyx lip bifid, the lower entire; banner strongly reflexed, pubescent dorsally, the wings 4 mm. broad, the keel eciliate.—Flowers violet, the banner medially golden-yellow. *L. brevicaulis* Griseb. has smaller flowers, the banner obscurely pubescent. F.M. Neg. 1998.

Huancavelica: Apacheta, Prov. Castrovirreina, wet places, bunch-grass formation, *Weberbauer 5458*, type.

Lupinus Pipersmithianus Macbr., spec. nov.

Fruticosus ad 2 m. altus; caulibus breviter et molliter albo-villosis; stipulis lineari-subulatis ad 10 mm. longis; petiolis 3.5–7 cm. longis; foliolis complanatis oblongo-ellipticis ubique acuminatis ad 6 cm. longis, 11 mm. latis, membranaceis utrinque adpresse cinereo-pilosis; pedunculis et racemis elongatis; pedicellis circa 8 mm. longis patente puberulis; bracteis caduceis anguste lanceolatis, acuminato-aristulatis, 10 mm. longis; calycis subadpresse sericeo-pubescentis ut videtur ebracteolati labio superiore bidentato circa 8 mm. longo, inferiore arcuato integro 10 mm. longo; floribus 17 mm. longis, vexillum leviter pubescens alae circa 8 mm. latae carina eciliata.—At least among Peruvian lupines this appears to be better marked than most of the forms described as species; its nearly oblong leaflets are grayish-green by the close appressed soft but not at all silvery pubescence; its flowers suggest those of *L. notabilis* but the pedicels are spreading pubescent and the leaflets acute at each end as in the otherwise different *L. exochus*. A canescent bush, the flowers deep blue with yellow and white pattern on keel (collectors).

Apurímac: Ampuy, edge of forest in shrub-land, 3,100 meters, *Goodspeed 10594*, type.

Lupinus praealtus C. P. Smith, Sp. Lupin. 163. 1940.

Erect, tree-like, sometimes attaining nearly 3 meters, the many branches finely and densely lanuginose, the many leaves green and glabrous or glabrate above, subsericeous beneath; stipules 10 mm. long or somewhat longer; petioles 2.5–3.5 cm. long with 7–8 sub-oblanceolate acute leaflets to 3 cm. long, 6 mm. broad; peduncles about 3 cm. long, the much longer racemes flowered, the bracts deciduous; pedicels 4–6 mm. long, subappressed-pubescent; flowers

15 mm. long, subverticillate; upper calyx lip bidentate, lanceolate, about 7 mm. long, the lower entire, 8–9 mm. long; banner suborbiculate, lightly pubescent, the wings broad, the keel eciliate.—Rose had indicated in herbarium the type number, from a small tree to 3 meters high, as new.

Lima: Canta, 3,100 meters, (*Pennell 14611*).—Huánuco: Near Huánuco, open bushy hillside, *2144*, type.—Cuzco: Saxaihuamán, 3,500 meters, (*Pennell 13579*).

Lupinus praetermissus C. P. Smith, Sp. Lupin. 183. 1940.

Shrub, the slender branches glabrate, the branchlets laxly spreading, greenish but more or less appressed-hirsute; stipules linear to 6 mm. long; petioles 2–3 (4) cm. long, slender with 5–8 linear-oblanceolate flat or early conduplicate acute leaflets, appressed-sericeous both sides, the larger to 18 mm. long, 3.5 mm. broad; peduncles a cm. or two long, the racemes a little longer with in type only 3–4 few-flowered verticils; bracts ovate, lanceolate, aristate, 4–5 mm. long, persisting; pedicels to 4 mm. long, the pubescence spreading; flowers 10 mm. long, the villous-hirsute calyx with bidentate upper lip, 3 mm. long, the lower apparently entire, 4–5 mm. long; banner suborbiculate, pubescent near tip, wings to 5 mm. long, the keel typically eciliate.—Type referred by Ulbrich to *L. paniculatus* var. *parviflorus* Wedd. In *Weberbauer 7598* the keel is ciliate. Apparently this with *L. Wilkesianus* could readily be included in *L. paniculatus*.

Ayacucho: Near Ayacucho, *Weberbauer 5480*, type. Yanahuara Valley, grass steppe, *Weberbauer 7598*.—Cuzco: Near Urcos, (*Stafford K74*).

Lupinus prostratus Agardh, Syn. Gen. Lupin. 39. 1835; 270.

Low prostrate much-branched more or less congested shrub, the stems 3–5 (10) cm. long, spreading pubescent with long trichomes or, fide Smith, minutely villous; petioles 3–8 mm. long; leaflets 6–8, to 4 mm. long, about 1 mm. broad (or broader, fide author), conduplicate, the margins involute, glabrous above, pilose beneath or, fide Smith, subsericeous both sides; peduncles 1.5–several cm. long, subappressed-villous, the racemes capitate with 1 or 2 verticils; bracts 3 mm. long, lanceolate; flowers 10 mm. long, subsessile; calyces subappressed-villous, the upper lip bifid, about 3 mm. long, the lower entire, 5 mm. long; banner narrowly ovate with a few trichomes near the tip, the wings about 3 mm. broad, the keel

eciliate; ovules 4; pods 10 mm. long, 3 mm. broad, yellowish, appressed-sericeous.—Smith remarks that his description drawn from the type specimen does not exactly agree with that of Agardh (I have noted the principal discrepancies) and adds: "It seems odd that we have seen no material which we can assign to this species." As a matter of fact this is not at all odd in view of the narrow interpretation by Smith of "species"; it is probably the alpine plant—smaller in all parts—cf. at least *L. chlorolepis* and *L. Gilbertianus*. Allied is *L. humifusus* Benth. of the northern Andes to which Peruvian material has been referred, but it has smaller flowers.

Junín: Cerro de Pasco, (*Mathews 684*). Without locality, (*Jussieu*, type).

Lupinus pulvinaris Ulbrich, Bot. Jahrb. 37: 541. 1906; 258.

With cespitose pulvinate habit of *L. conicus* but the pubescence subappressed and especially the petioles at most 2 cm. long, usually much shorter; leaflets 2–6 mm. long, obovate; bracts 2–3 mm. long, persisting; flowers sessile, 5–6 mm. long, the upper lip bifid, about 1 mm. long, the lower tridentate, twice as long; banner obovate, glabrous, 5 mm. long, 3 mm. broad, the wings scarcely 1.5 mm. broad, the keel eciliate.—F.M. Neg. 2000.

Puno: Sandía, 4,500 meters, *Weberbauer 985*, type; 219.

Lupinus ramosissimus Benth. Pl. Hartw. 170. 1845; 154. *L. ambaticus* C. P. Smith, Sp. Lupin. 287. 1941.

Branched shrub several to 12 dm. high, the branches minutely appressed-subsericeous as the slender petioles and leaflets beneath, the former 1.5–2.5 cm. long, the latter 2 to rarely 3 cm. long, 2–2.5 (3) mm. broad, glabrous above, oblong-linear, flat or conduplicate; stipules linear, 2–3 mm. long; peduncles 1–2 cm. long, the lax racemes with 4 or more verticils; bracts deciduous; pedicels 3 mm. long, subappressed-sericeous; flowers 12–14 mm. long, the upper calyx lip bidentate to 5 mm. long, the lower arcuate, entire, to 6 mm. long; banner glabrous, broadly obovate, reflexed, the wings to 5 mm. broad, the keel eciliate or ciliolate; ovules 4–5; pods to 3 cm. long, 8 mm. broad, moderately subappressed-sericeous.—The Peruvian plant in part is var. *ambaticus* C. P. Smith, l.c. 147, the stipules 4–6 mm. long, leaflets glabrate above, racemes perhaps longer with 6–8 verticils, wings to 7 mm. broad, ovules 5–7. In accord with Smith's drawing of specific lines, the plant is probably a "species." F.M. Neg. 2001.

Lima: Puruchuca, (*Mathews 479*, in part, the typical form fide Smith).—Amazonas: Chachapoyas, (*Mathews 1570*). Ecuador.

Lupinus Richardianus C. P. Smith, Sp. Lupin. 153. 1940.

Apparently ex character similar to *L. visoensis* but the petioles 10–15 mm. long, the leaflets to 15 mm. long, 4 mm. broad, conduplicate; peduncles slender, 3–5 cm. long, the racemes with 6–10 verticils, the aristate bracts persisting, 5–10 mm. long; pedicels 5–8 mm. long.—Perhaps from Ecuador but the locality possibly, according to Smith, Huaytara in Huancavelica.

Peru (?): (*Richard Pearce*, type).

Lupinus romasanus Ulbrich, Bot. Jahrb. 37: 546. 1906; 281.

Somewhat ligneous and branched, 3–6 dm. high, the spreading ascending branches appressed-pubescent; stipules about 10 mm. long; petioles 4–9 cm. long, subsericeous with appressed-villous trichomes; leaflets 8–9, linear, acute, conduplicate, to 3 cm. long, 2 mm. broad, densely sericeous-villous both sides; peduncles elongate, as long or longer than the racemes, these with 5–8 distinct verticils; bracts linear-lanceolate, 4–6 mm. long, deciduous; pedicels 2–4 mm. long, appressed-pubescent; flowers 13–15 mm. long; upper calyx lip bifid, about 5 mm. long, the lower slightly longer, lanceolate, entire, reflexing; banner orbiculate, glabrous, the wings 4–5 mm. long, the keel ciliolate; ovules 6.—F.M. Neg. 2002.

Ancash: Pampa Romas, 3,000 meters, *Weberbauer 3206*, type.

Lupinus sarmentosus Desr. in Lam. Encycl. 3: 626. 1791.

Apparently a sprawling or clambering half shrub, only the long, soon glabrate flowering branchlets herbaceous; stipules persisting, subulate, appressed-hirsute, 6–10 mm. long; petioles 1–3 cm. long, subappressed-hirsute-sericeous; leaflets mostly 7–9, oblong-lanceolate, acute, 16–20 mm. long, 2–3 (4) mm. broad, sparsely appressed-pilose-hirsute or glabrate above, paler and soon glabrous beneath except the rather densely appressed-hirsute midnerve and along the more or less revolute margins; peduncles several cm. long, the racemes rather open to about 5 cm. long with 3 or 4 verticils of flowers, these 7–10 (12) mm. long; bracts lanceolate, villous as the calyces, the upper lip of these deeply bifid, the lower entire; pedicels 2–3 (5) mm. long, spreading-villous; banner glabrous, broadly obovate, the wings 5–6 mm. broad, the keel eciliate.—Description in part from the Weberbauer collection which matches closely the

type except that the flowers (described as nearly those of *L. bractiolaris* Desr., that is, 7–10 mm. long) and the pedicels are a little longer. Apparently allied Ecuadorean species include *L. Taurus* Benth. Pl. Hartw. 128. 1843 and *L. Smithianus* Kunth, Mimoseae 177. *pl. 51.* 1819, both little shrubs more closely branched, the leaves very short-petioled, the revolute leaflets smaller. F.M. Neg. 28156.

Piura: Above Huancabamba, 3,000 meters, *Weberbauer 6095.* Without locality, *Joseph Jussieu,* type.

Lupinus saxatilis Ulbrich, Bot. Jahrb. 37: 548. 1906; 180.

Half shrub forming low (2–3 dm.) clumps, the many short branches minutely appressed-sericeous; stipules 7–10 mm. long; petioles 2.5–7 cm. long, with 5–7 oblanceolate acute flat or conduplicate leaflets, glabrate above, subsericeous beneath, to 3 cm. long, 6 mm. broad, mostly somewhat smaller; peduncles 2–5 cm. long, the racemes slightly longer with 2–6 verticils; bracts persisting, linear-lanceolate, 7–10 mm. long, equaled by the appressed-pubescent pedicels; flowers about 8 mm. long; upper calyx lip bidentate, 4 mm. long, the lower slightly longer, entire; banner broader than long, pubescent, reflexed, the wings about 9 mm. broad, the keel eciliate; ovules 3–4; pods about 15 mm. long, 5 mm. broad, appressed-sericeous.—F.M. Neg. 2004.

Arequipa: Near Sumbay, in rocks, 3,800 meters, *Weberbauer 1386,* type. At Sumbay, 4,200 meters, *Karl Schmidt.*

Lupinus semiprostratus C. P. Smith, Sp. Lupin. 244. 1941.

Spreading shrub, the slender subsericeous, subdecumbent outer branches 3–4 dm. long; petioles 2–5 cm. long; leaflets 5–8, oblanceolate, obtuse, glabrate above, to 3 cm. long, 8 mm. broad, appressed-villous sericeous beneath; stipules 6–10 mm. long, linear-subulate; peduncles to 8 cm. long, the racemes as long to 3 times longer with as many as 8 verticils; bracts linear-lanceolate, 5–8 mm. long, villous, deciduous, the pedicels 3 mm. long, the pubescence ascending-appressed; flowers about 12 mm. long; upper calyx lip deeply bidentate, 6–8 mm. long, the scarcely longer lower lip entire or tridentate; banner broad, glabrous or slightly ciliate at tip, the wings 4–5 mm. broad, the keel eciliate; ovules 3–5; pods at least 2 cm. long, 6 mm. broad, spreading-pubescent.—According to the collector, flowers pink-purple to deep purple with white wing medially yellow, the banner in age red. The type covered 2 dm. of ground, the stems semiprostrate, matted. Nearly *L. Cookianus* but leaflets smaller,

glabrate or glabrous above. *L. Rusbyanus* C. P. Smith, l.c. 157. 1940, is similar, the bracts longer, the banner pubescent.

Cuzco: Huailabamba, Prov. Paucartambo, *Balls 6735*, type.

Lupinus Staffordiae C. P. Smith, Sp. Lupin. 168. 1940.

Erect, at least 6 dm. high, the rather fleshy but solid stems branched above and spreading white-villous; stipules 10–15 mm. long; petioles 3–6 cm. long with 7–9 linear acute conduplicate leaflets 3–5 cm. long, 6 mm. broad, coarsely white-sericeous both sides; peduncles to 1 dm. long, the elongate racemes with linear-lanceolate white villous bracts 5–7 mm. long; pedicels 5–8 mm. long, spreading-pubescent; flowers 12–14 mm. long, the calyces villous, the upper lip of these bidentate, 3–4 mm. long, the lower entire, about as long; banner broader than long, pubescent near tip, the wings 6 mm. broad, the keel eciliate.

Cuzco: Near Ursco, (*Dora Stafford S.T.11*, type).

Lupinus sufferugineus Rusby, Bull. N. Y. Bot. Gard. 6: 510. 1910; 184.

Erect subherbaceous perennial 2–4 dm. high, the densely tomentose stems often simple; stipules 8–10 mm. long; petioles 2–10 cm. long with 6–8 oblanceolate obtuse sometimes flat leaflets to 3 cm. long, 7 mm. broad, densely velvety sericeous both sides; peduncles 4 cm. long, the racemes much longer; bracts 10–12 mm. long, lanceolate, subpersisting; pedicels about 2 mm. long, spreading-pubescent; flowers 10 mm. long; calyx lips lanceolate, both 4 mm. long, spreading-pubescent; banner suborbiculate, pubescent, the wings about 4 mm. broad, the keel apparently eciliate; ovules 3; pods 18 mm. long, 6 mm. broad, densely subappressed-pubescent.

Puno: Juliaca, Titicaca, *R. S. Williams 2518*, type.

Lupinus syriggedes C. P. Smith, Sp. Lupin. 283. 1941.

Similar to *L. Lindleyanus* but more robust, 7–9 dm. high; leaflets 7–11, to 5.5 cm. long, 3 mm. broad, glabrate beneath; verticils 7–10, the bracts caducous, the pedicels 2–3 mm. long; upper calyx lip deeply bidentate; ovules 7–8; pods 3–3.5 cm. long.—According to the author near *L. bicolor* Lindl. and if so probably should be considered with *L. Lindleyanus* and its variety as part of a more practically drawn species-concept.

Lima: Río Blanco, open hillside, *Killip & Smith 21653*, type.

Lupinus tarapacensis C. P. Smith, Sp. Lupin. 178. 1940.

Shrub a few dm. high, the slender branches minutely sericeous, the leaves densely so both sides, the trichomes appressed; stipules to 7 mm. long; petioles 1.5–3 cm. long; leaflets 6–7, elliptic-oblanceolate, scarcely acute, conduplicate, to about 2.5 cm. long, 6 mm. broad; peduncles 3 cm. long, the racemes several times longer with as many as 10 verticils; bracts ovate-lanceolate, 5 mm. long, deciduous; pedicels 5–8 mm. long, the pubescence spreading; flowers 13 mm. long, the upper calyx lip to 4 mm. long, deeply bidentate, the subequal lower entire, not reflexed; banner suborbiculate, somewhat pubescent near tip, the wings broad, the keel eciliate.—*Weberbauer 6894*, ex char., seems to belong here, the species apparently except for the shorter petioles much like *L. Gayanus*, et rels.

Lima: Huamantanga, (*Barclay*).—Junín: Near Palca, (*Weberbauer 2433*).—Arequipa: Chivay, 4,000 meters, *Weberbauer 6894*.—Puno: Mountains of Puno, (*Lechler 1569*). Chile.

Lupinus tomentosus DC. Prodr. 2: 409. 1825; 170.

Shrub, the branchlets densely sericeous tomentose, some of the longer trichomes somewhat spreading; stipules 1–2 cm. long, the linear-lanceolate portion half as long; petioles pubescent like the branchlets, 4–6 cm. long; leaflets 5–7, oblanceolate, acute or rounded at tip, apiculate, to 4.5 cm. long, 10 mm. broad, densely appressed-sericeous both sides; peduncles 3 to several cm. long, usually much longer; racemes with many verticils; bracts lanceolate, promptly deciduous, about 12 mm. long; rachis and pedicels densely short spreading-villous, the latter 6–10 mm. long; flowers about 16 mm. long or perhaps a little longer; upper calyx lip bidentate, 6 mm. long, the lower entire, 7–8 mm. long; banner suborbiculate, pubescent, the wings 8 mm. broad, the keel eciliate.—Perhaps the Cook & Gilbert specimen should be included in the segregate *L. tarapacensis*. F.M. Neg. 6969.

Lima: Baños and Culnai, (*Wilkes Exped. & Maclean*, fide Gray).—Puno: Azangaro, *Soukup 968* (sens. lat.). Locality unknown, ex herb. Lagasca, probably *Née*, type.—Cuzco: Ollantaytambo, *Cook & Gilbert 410* (det. Smith, *L. Holwayorum*). "Oquero."

Lupinus toratensis C. P. Smith, Sp. Lupin. 179. 1940.

Shrub about 5 dm. high, the appressed sericeous branchlets lax or curved, the crowded leaves densely silvery sericeous both sides; stipules to 5 mm. long; petioles 1.5 (2) cm. long; leaflets 5–7, broadly

elliptic-oblanceolate, to 15 mm. long, 6 mm. broad; peduncles a cm. or two long, the racemes 8 cm. long or longer with many verticils; bracts ovate-acuminate, about 3 mm. long, promptly deciduous; pedicels 4–5 mm. long, the villous pubescence spreading; flowers 10 mm. long; upper calyx lip bidentate, 3 mm. long, the lower slightly longer, entire; banner suborbiculate, somewhat pubescent near tip, the wings broad, the keel eciliate.—Flowers violet, the yellow middle stripe of banner changing to brownish-red (Weberbauer).

Moquehua: Torata, open mixed formation, 3,200 meters, *Weberbauer 7467*, type.

Lupinus Ulbrichianus C. P. Smith, Sp. Lupin. 171. 1940.

Branched shrub probably to 4 dm. high, the stout solid stems to 3 mm. thick, densely lanuginose; stipules 7–9 mm. long; petioles 4–5 cm. long with 6–7 elliptic-oblanceolate leaflets to 5 cm. long, 12 mm. broad, densely and softly sericeous both sides, the trichomes appressed above; peduncles to 3 cm. long, the much longer racemes with 6–12 verticils; bracts deciduous, linear-lanceolate, to 8 mm. long; pedicels 2–4 mm. long, densely spreading-pubescent; flowers about 12 mm. long, the upper calyx lip minutely bidentate or entire, to 5 mm. long, the lower slightly longer, arcuate; banner suborbiculate, glabrous, the wing 7 mm. broad, the keel eciliate.—The type was referred by Ulbrich to *L. oreophilus* Phil. of Chile, with narrower leaflets, more definitely bidentate calyx lip, the banner according to Smith either glabrous or more or less pubescent. *L. pubescens* Benth., 172, of Ecuador shares many of the characters of this plant but the pubescence is much laxer especially on the leaflets above. Probably the species should (with *L. oreophilus*) be included in *L. tomentosus* as a variety with shorter pedicels, smaller flowers, banner glabrous, even the presence or absence of pubescence on the banner being of doubtful taxonomic significance as in *L. oreophilus* according to the monographer himself!

Puno: Between Sandía and Cuyocuyo, *Weberbauer 870*, type; 237.

Lupinus urubambensis C. P. Smith, Sp. Lupin. 245. 1941.

Laxly growing subherbaceous or half shrub, the glabrate stems to 8 dm. high; stipules 6–10 mm. long; petioles 2–4 cm. long, with 5–8 somewhat oblanceolate (or broadest at the middle) flat acute and apiculate leaflets to 4.5 cm. long, 10 mm. broad; peduncles to 1 dm. long, the longer racemes with many verticils, the bracts linear, 6–8 mm. long, deciduous; pedicels spreading-pubescent, 3–4

mm. long; flowers 13–15 mm. long, the upper calyx lip bifid, about 4 mm. long, the lower entire or minutely tridentate, 5–6 mm. long; banner suborbiculate, glabrous, the wings 6–8 mm. broad, the keel eciliate.—According to the collector, plant with loose bushy habit growing on steep banks in rocks. Probably with *L. Ynesiae* to be included in *L. Cookianus*.

Cuzco: Machu-picchu, Urubamba Valley, about 2,000 meters, *Balls 6805*, type.

Lupinus visoensis Macbr. Field Mus. Bot. 8: 97. 1930; 274.

Much branched shrub to 1 meter high, the somewhat tortuous branchlets soon glabrous; stipules 4 mm. long; petioles 3–5 mm. long, with 5–8 obovate leaflets rounded at tip, mostly flat, to 1 cm. long, 5 mm. broad, glabrous above, sparsely and finely appressed-sericeous beneath; peduncles 1–2 cm. long, the racemes rarely twice as long; bracts ovate, about 3 mm. long, caducous; pedicels as the racemes, rachis and calyces densely spreading-villous, 4–6 mm. long; upper calyx lip shortly bidentate, the lower entire, both about 5 mm. long; banner suborbiculate, pubescent above the middle, the wings to 7 mm. broad, the keel eciliate.—Type from a round shrub with fragrant light but bright blue flowers, the banner with a central stripe.

Lima: Tambo de Viso, rocky grassy knolls, *596*, type.

Lupinus Weberbaueri Ulbrich, Bot. Jahrb. 37: 541. 1906; 263.

Tufted perennial herb, the long-petioled leaves crowded about the short fistulose peduncle of the much longer dense racemes of pale lilac flowers; stipules 2–5 cm. long; petioles 6–20 cm. long, conspicuously long-villous, flat (the trichomes 5–10 mm. long), and shortly puberulent; leaflets 8–12, to 10 cm. long, 15 mm. broad, acuminate, densely appressed-sericeous both sides and villous on midnerve; peduncles to 1 dm. long, 1–2 cm. thick; racemes 2.5–4 dm. long, the linear persisting bracts 1.5–2 cm. long, more or less concealed between the numerous flowers, these 16–18 mm. long on pedicels 2–3 mm. long; calyx villous, the upper bifid lip 8–9 mm. long, the lower entire, 10–12 mm. long; banner ovate, about 17 mm. long, 12 mm. broad, scarcely reflexed, sublanate-villous, the nearly as long wings 8 mm. broad, the keel eciliate.—Allied to *L. alopecuroides* Lam. and *L. nubigenus* HBK. both of Ecuador, but differing in character of bracts and especially in pubescence; Weddell, Chlor. And. 250. 1857, united those two forms by error accord-

ing to Ulbrich; they lack the appressed-sericeous trichomes that are present on *L. Weberbaueri.* In the plant of HBK. the spikes are subsessile, surpassed or equaled by the leaves. Illustrated, Weddell, l.c. *pl. 79* (as *L. alopecuroides,* var.). F.M. Neg. 2015.

Ancash: Near Yungay, bunch-grass formation, 4,400 meters, *Weberbauer 3264,* type.—Lima: Above Baños, (*Wilkes Exped.* as *L. nubigenus,* probably belongs here). Locality not known, *Weberbauer 7076;* 226.

Lupinus Werdermannianus C. P. Smith, Sp. Lupin. 178. 1940.

In general similar to *L. tarapacensis* but the branchlets conspicuously subappressed-villous, the pedicels 3–5 mm. long.—The type is the right-hand specimen on the sheet in the Gray Herbarium; since according to the author the allied "species" (*L. tarapacensis,* the type the left-hand specimen) is in Peru, this form is likewise to be expected.

Peru (probably). Chile.

Lupinus Wilkesianus C. P. Smith, Sp. Lupin. 156. 1940.

Low laxly branched shrub, the branches appressed-subsericeous, the many leaves light or yellowish-green, glabrous or glabrate above, appressed-sericeous beneath; petioles 2–2.5 cm. long with 5–8 linear acute leaflets to 3 cm. long, 4 mm. broad; peduncles slender, often 5 cm. long, the racemes to twice as long, with 8 or more verticils; bracts lanceolate, 5 mm. long, persisting, the pedicels as long or slightly longer, spreading-pubescent; flowers about 10 mm. long; upper calyx lip bidentate, 4 mm. long, the lower entire, 6 mm. long; banner suborbiculate, pubescent, the wings broad, the keel eciliate; pods villous, about 3 cm. long, 8 mm. broad.—To *L. celsimontanus* C. P. Smith, l.c. 153, the author has referred, l.c. 286, *Herrera 3117;* this species is based on *Buchtien 4474* from Bolivia and it seems doubtful if it is distinguishable. In all probability this is *L. paniculatus* Desr. in spite of the fact that the bracts were described as deciduous; apparently similar is *L. Rusbyanus* C. P. Smith, l.c. 157, from adjacent Bolivia.

Lima: Obrajillo, *Wilkes Exped.,* type; *Pennell 14400.* Huaros, open rocky slope, 3,200 meters, *Pennell 14736.* Canta, *Pennell 14611* (det. Smith in herb. Gray, *L. praealtus*). Cerro Colorado, near Canta, *Pennell 14665.*—Cuzco: Saxaihuamán, 3,500 meters, (*Herrera 3117?*); cf. note above.

Lupinus Ynesiae C. P. Smith, Sp. Lupin. 281. 1941.

Doubtfully distinct from *L. urubambensis* but stems slender, largest leaflets 2.5–3.5 cm. long; flowers 10–13 mm. long, ascending or spreading; calyx appressed silky.—According to Smith his other species has stems stoutish and subfistulose, largest leaflets 4.5–5 cm. long, flowers 13–15 mm. long, some drooping; calyx spreading-pubescent; keel eciliate or ciliolate; ovules 3 or 4; pods 3 cm. long, 8 mm. broad, laxly pubescent; seeds 5 mm. long, 3 mm. broad, purple mottled. These differences it seems to me are not of moment or entirely apparent only in type material. *L. urubambensis* was published in August, *L. Ynesiae* in September.

Cuzco: Machu-picchu, Urubamba Valley, 2,200 meters, among shrubs and herbs, *Ynes Mexia 8076*, type.

KRAMERIA Loefl.

By Dorothy H. Hartmann, University of California

Small shrubs or perennial herbs with leaves alternate, exstipulate, entire, simple except in one species. Flowers perfect, slightly irregular, small, pink to purple, solitary in the axils on 2-bracted pedicels. Sepals 4 or 5, petal-like. Petals 4 or 5, smaller than the sepals, the upper 2 or 3 separate and parallel, or variously united, the lower 2 reduced to rounded, fleshy scales. Stamens 3 or 4, all on upper side of flower, separate or united, anthers opening by a terminal pore. Ovary superior, 2-ovuled, style one. Pod dry, subglobose or cordate, indehiscent, pubescent, spiny, 1-seeded.—Southern United States, Mexico, West Indies, South America.

[Mrs. Hartmann, in connection with her study on the family position of this aberrant group has kindly furnished me with the descriptions but has not passed on all of the material cited. *K. cistoides* Hook. of northern Chile has flowers 5-merous, but with 4 stamens, 3 round petals. Johnston has suggested that *K. iluca* Phil. of Chile with only 3 stamens and 2 round petals is possibly "no more than a good variety of *K. triandra*." It is possible that exact examination will disclose that similar variation—varietal or specific—exists in the Peruvian material but it is noteworthy that as careful a worker as Ulbrich refrained from publishing as distinct two diverse collections to which he had given names in the herbarium. *K. pentapetala* R. & P. Fl. Peruv. 1: 62. *pl. 94*, purporting to have come from "Province Panatahuara," is probably actually Mexican in origin (there is, apparently, no province of this name in Peru, and some Ruiz and Pavón collections are known to have been

confused with Sessé and Mocino specimens from Mexico); it is moreover similar if not the same as *K. pauciflora* DC. of Mexico with 5 sepals, the claws of the upper petals united.—J.F.M.]

Krameria triandra R. & P. Fl. Peruv. 1: 61. *pl. 93.* 1803.

Subprostrate shrub 3–6 dm. high; old branches gnarled, young, silky-pubescent; leaves sessile, ovate to obovate, 10–15 mm. long, silky-gray-pubescent; flowers deep rose, 1.5 cm. diam., borne in axils of the upper leaves; sepals 4; petals 4, upper 2 spathulate, nearly equaling the sepals, separate to the base; stamens 3, separate, equal; fruit subglobose, 1.5 cm. diam., spines slender, reddish, retrorsely barbed near the tip.—Ruiz & Pavón recorded the localities as Tarma, Huánuco, Canta and Huancheri.

The root has astringent properties and is used in medicine under the name "rataña" (cf. Ruiz, Travels of Ruiz, Pavón and Dombey in Peru and Chile, Field Mus. Bot. 21: 200. 1940). F.M. Neg. 1630.

Cajamarca: Between Siena and Puna, (*Raimondi*). Santa Cruz, *Weberbauer 4130* (det. Ulbrich).—Amazonas: Bajada del Marañón, (*Raimondi*).—Huánuco: Huánuco, 1,826 meters, *3505; Kanehira 54.* Llata, 2,133 meters, *2274* (det. Johnst.).—Junín: Huancayo, 3,300 meters, *Killip & Smith 22016.* Tarma, 3,000 meters, *1027; Killip & Smith 21850.*—Ayacucho: Río de Lomas and Río Yauca, *Weberbauer 5478* (spec. nov. Ulbrich, ined.).—Huancavelica: Near Mantaro Bridge, 1,800 meters, *Goodspeed 10396* (det. Standl.).—Apurímac: Río Apurímac, 1,200 meters, *Weberbauer 5886* (spec. nov. Ulbrich, ined.).—Arequipa: Chachani Mountain, 3,660 meters, *Hinkley 5.* Atiquipa, (*Raimondi*). Yura, *Karl Schmidt* (det. Standl.).—Cuzco: Limatambo, 2,200 meters, *Weberbauer 5917* (det. Ulbrich). Ollantaytambo, 3,000 meters, *Cook & Gilbert 546; Herrera 3389; 3408.* Prov. Calca, *Vargas 163* (det. Standl.); (*Herrera 182,* as spec. nov. ined. fide *Herrera*). Bolivia. "Pacha-lloqque" (Herrera), "pumacuchu" and "mapato" (R. & P.).

NOTE.—While this book was in press I received from Miss Nelly Dubugnon, Conservatoire Botanique, Genève, the following record (det. Harms). Place after *Sophora*, fide Bentham, **Gourliea decorticans** Gill. in Hook. Bot. Misc. 3: 208. pl. 106. 1833. Shrub with slender shortly spinescent branchlets, imparipinnate leaves with many small estipellate leaflets and small papilionaceous yellow orange-lined flowers in racemes a cm. or two long, often clustered at the older nodes. Bracts none, bractlets minute. Upper calyx lobes truncate, subconnate, lower narrower. Petals clawed, banner orbiculate, spreading, wings obliquely obovate, keel with shorter slightly incurved obtuse petals subconnate dorsally. Stamens free or nearly. Ovary sessile, several-ovuled; style incurved, subulate, the stigma small. Pod ovoid-globose, subdrupaceous, woody with 1–2 thick reniform estrophiolate seeds.—Prov. Arequipa, 4-meter shrub, *Weberbauer 1437* (det. Harms). Tacna, *Woitschach.* Chile; Argentina. "Chaño."

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